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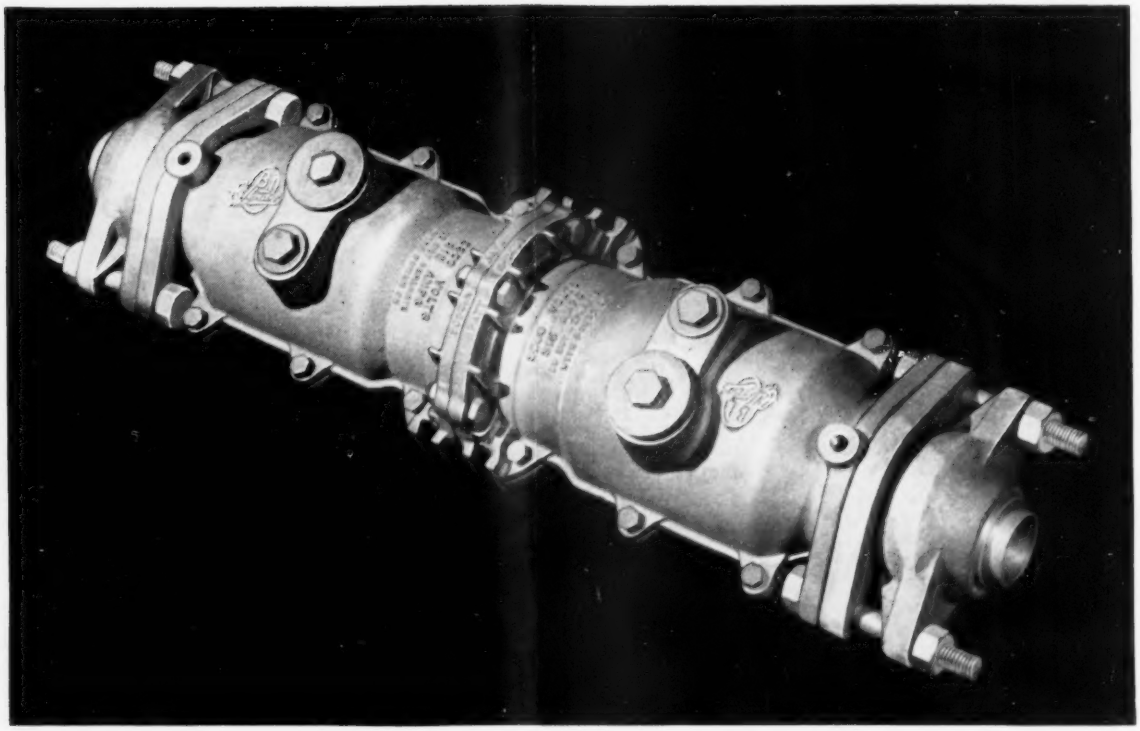

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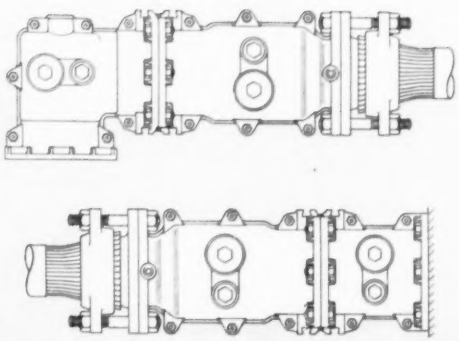

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HOW ATLAS COPCO EQUIPMENT HELPED FRANCE PRODUCE 55 MILLION TONS OF COAL IN 1954

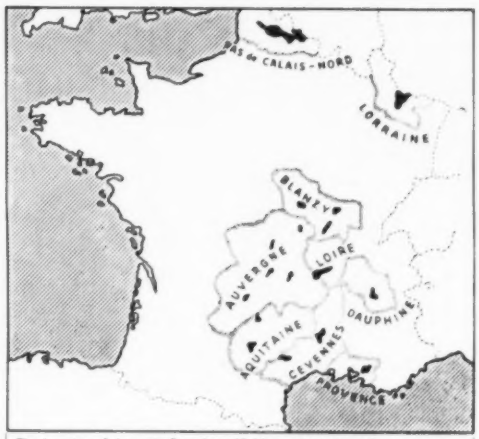
France today is one of the leading coal-producing countries in the world. The progressive modernisation policy of French mining authorities has created an industry that is one of the strongest links in the country's economy. With the introduction of new mining methods, production figures have risen year by year reaching fifty-five million tons in 1954.

Over the last ten years France has started nineteen new mines and modernised many more. In these mines, productivity is the highest in Europe while output per man-shift saw an increase of 55.8% between 1948 and 1954.

GETTING AT THE COAL

The fifty-five million tons of coal produced in 1954 entailed immense development work. It meant the drilling of 125 miles of galleries and the excavation of sixty million cubic feet of rock. With the use of fast and efficient drilling equipment on these preliminary operations, 1954's high production figure was achieved.

To speed development work, French mining engineers brought in the lightweight combination of pusher leg drills and tungsten-carbide-tipped drill steels—a drilling method pioneered by Atlas Copco and Sandvik in the early 'forties. At the present time four thousand of these light rock drills are in operation throughout the French coalfields. Many of them are *Atlas Copco* drills fitted with *Sandvik Coromant* steels.



The location of the main French coalfields in which Atlas Copco drills and Sandvik Coromant drill steels are extensively used

Atlas Copco rock drills on development work down a mine in the Nord-Pas de Calais area. By speeding up development work France was able to produce 55,000,000 tons of coal in 1954.

The Atlas Copco light rock drills and Sandvik Coromant tungsten-carbide-tipped steels in use down the mines were supplied by Atlas Copco France S.A., the French company in the world-wide Atlas Copco Group.

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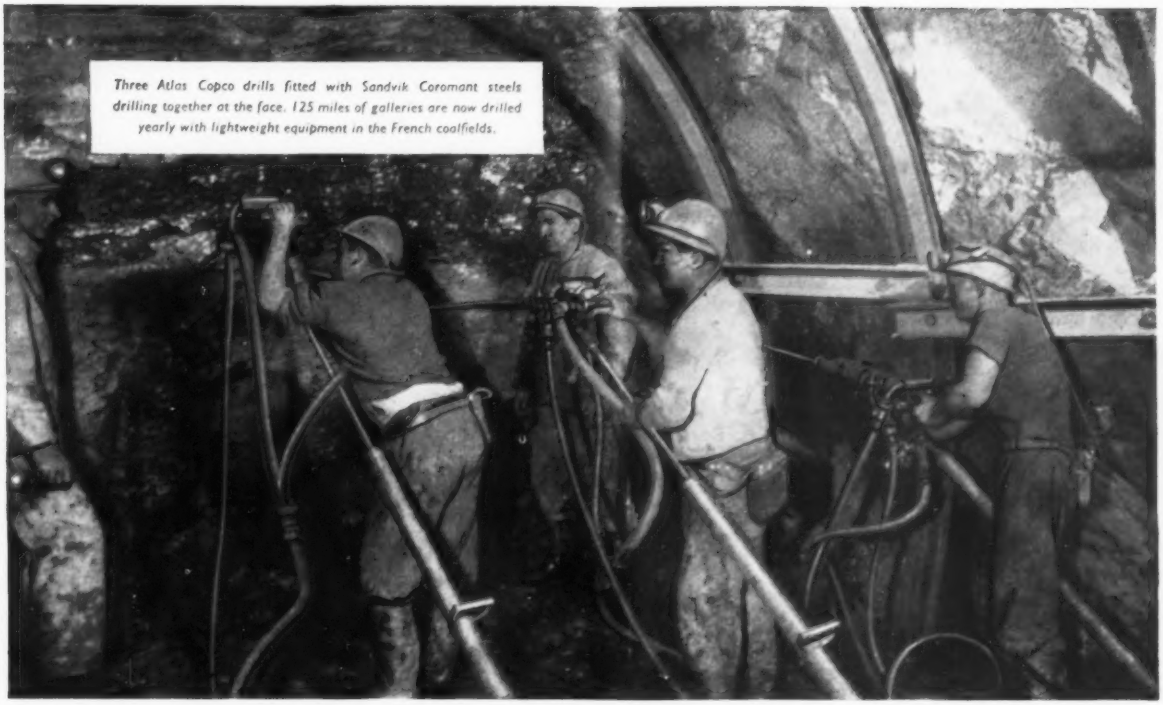

Three Atlas Copco drills fitted with Sandvik Coromant steels drilling together at the face. 125 miles of galleries are now drilled yearly with lightweight equipment in the French coalfields.

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*Atlas Copco light, **one-man** rock drill in action at the Henin Liétard Mine. It is fitted with a Sandvik Coromant tungsten-carbide-tipped drill steel.*

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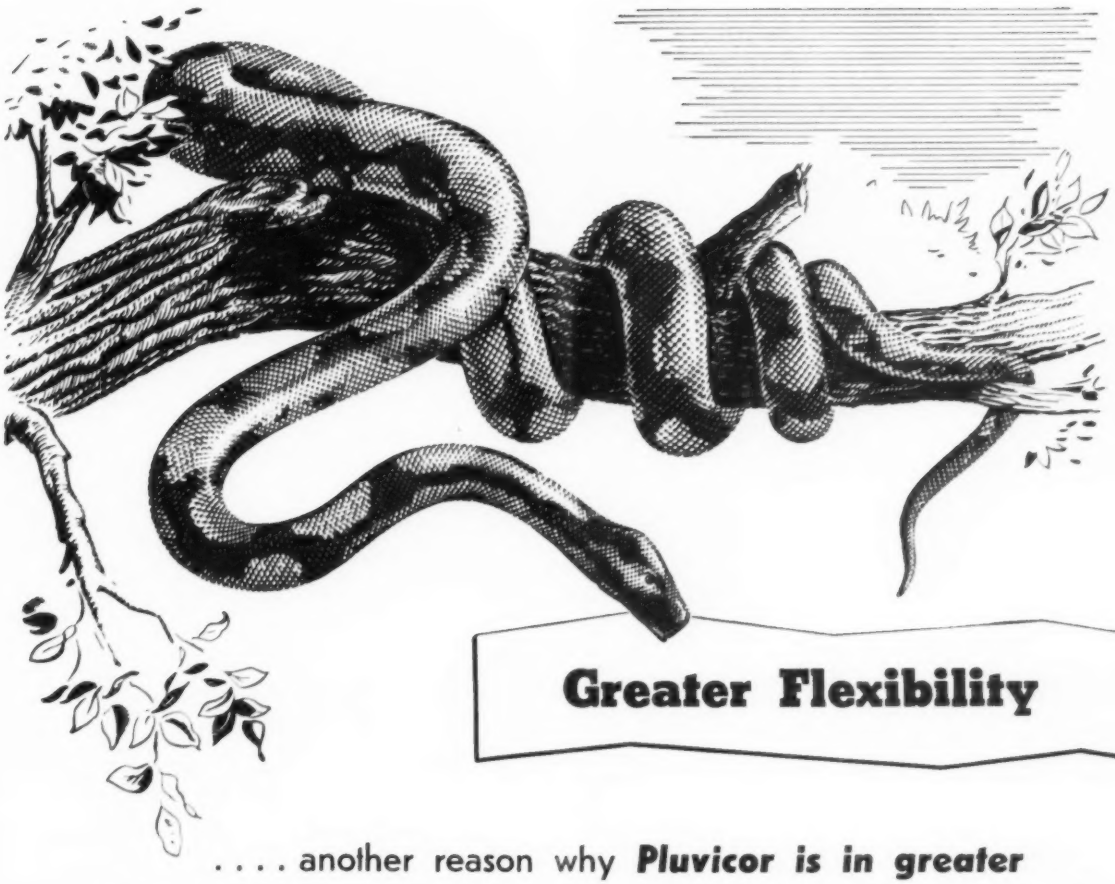

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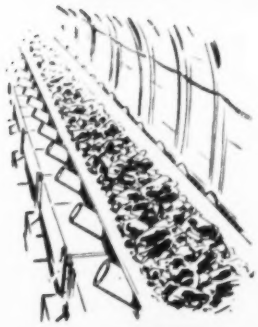

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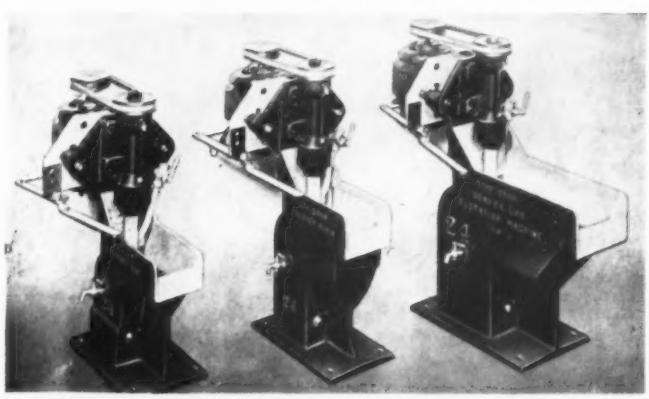

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NOTES AND COMMENTS

Trade Winds in Bolivia

The suspicion with which foreign capital has been and still is regarded in most Latin American states has long constituted the major deterrent to closer trading relations with South America, and also explains the lack of technical and economic progress of that vast and potentially rich continent. Few, if any, European countries in the past have invested with impunity and such memories have barred the door on more than one occasion to the export of capital.

The lightning tour of Europe and the United States by Sr. Kubitschek, the newly-elected president of Brazil, has done much to re-focus attention on the possibilities of profitable and productive investment in Brazil which has been extended to a re-examination of the economic situations prevailing in other Latin American countries.

The essential pre-requisites for successfully attracting a flow of foreign capital are financial stability, reasonable treatment with regard to the repatriation of profits, and an equitable basis on which to carry out operations.

These desiderata would appear to be well on their way to being fulfilled in Bolivia although the country's complex system of foreign exchange control has yet to be reduced to a practical working basis. Nevertheless the Bolivian rate of exchange has hardened appreciably in recent months and the cost of living index has tended to stabilize. Bolivia has now embarked on a policy of strengthening its reserves by allowing larger imports which in practice has meant that exporters can use their foreign exchange earnings for imports. These have been important factors in encouraging foreign capital, as indeed has been the approval of the long awaited Petroleum Law under which the oil resources of the country are now open to the exploitation of foreign investors.

Under these favourable conditions developments connected with the country's mining and metallurgical industry have proceeded apace. The contract for the sale of tin concentrates by the Corporacion Minera to a U.K. smelter has been renewed for a further five years and the Federal Facilities Corporation of the United States has agreed to extend the purchase of Bolivian tin for the Texas Smelter to the end of April next. Moreover, Ventures Ltd. of Canada, National Lead of the United States, Krupps of Germany and a Japanese group have all submitted bids to obtain the concession of a large zinc deposit near Lake Titicaca, known as "Matilde". The United States company, the Bolivian Exploration and Development Corporation, has signed a contract with the Bolivian government for a gold mining concession between the Rivers Deni, Kaka and Makiri and is prepared to invest U.S.$4,000,000 and pay a royalty of 12½ per cent. These developments followed the government's decree, issued in November last, granting more favourable conditions to private mining companies which also conceded the right to the companies to use their profits to import materials necessary for the expansion of production. An interesting discovery awaiting developments is the large deposits of manganese assaying between 55 per cent and 65 per cent metal content recently located at El Cafetal.

Broadly speaking, however, the foregoing events can hardly be described as being of world-wide significance. But out of their specific mining context they strongly suggest that the antagonism and resentment built up since the end of the second world war against foreign investment, has undergone radical and far-reaching changes. More than that, what has happened in Bolivia, together with what the Brazilian President has pledged himself to achieve by way of opening up that country to foreign capital, may well prove to be a sufficiently strong combination to decisively influence other Latin-American states to open their doors and allow in a good healthy dose of fresh air to aerate their present stagnant economic climates even if the waftings are financed by pounds sterling, dollars and deutchmarks.

Public Relations in South Africa's Mining Industry

The admirable initiative shown recently by the Anglo American Corporation in flying a party of City journalists out to Johannesburg for a two week look-see at the South African mining scene, may in due course very possibly reap a richer harvest for the industry as a whole than the casual observer might have thought likely from a visit sponsored exclusively by one Group. It goes without saying, of course, that Anglo American itself stands to benefit from the trip in terms of the more informed comment and greater understanding, which comes to any commentator who has "seen

for himself". Every journalist is familiar with the story of the golf correspondent who was in the habit of pushing his way to the front of the crowd at the big meetings with the cry "Out of my way; I am watching for a million!" The party which travelled to South Africa recently was, of course, watching for more millions than one and it will be surprising if many of the impressions, either confirmed or modified by first hand experience, do not get accurately conveyed to a much wider audience.

What might be described as the unconvenanted bonus arising from the trip is to be found in the heightened awareness of the problems of public relations which the visit appears to have aroused among several of the South African mining groups, and in retrospect it may well be seen that this isolated event proved a decisive factor in bringing the gold industry to the more general adoption of those techniques of public relations which are already the accepted norm in, for example, the oil industry.

Once the majority in the South African gold mining houses come to appreciate the benefits which can flow from the more professional performance of activities on which to a greater or lesser extent each group is already of necessity engaged, one may then perhaps hope that the Chamber of Mines will itself be brought to a more constructive view of its duties in this field. It would, of course, be wrong to imply that the Chamber at present is entirely inactive. This is not the case, and indeed in matters affecting recruitment both of Europeans and natives, the Chamber is doing much useful work in informing public opinion. It would, however, be equally wrong to give the impression that the Chamber conducts its public relations with the same purpose, understanding and flair for anticipation of public reaction, which is to be found in many big industrial concerns. Illustrative of this was the surprise among most of the London journalists recently visiting Johannesburg, of the discovery that the Chamber had in fact got a London office. Certainly even among those journalists, who knew of its existence, it appeared that few, if any, relied on it as a regular channel of news or of informed background comment on events affecting the industry. Yet there are obviously a whole range of topics affecting the industry as a whole, on which the Chamber could comment more suitably than could any one of its members.

The unfortunate consequences of the Chamber's negative attitude to public relations are apparent in the introduction to our article on the outlook for the industry's labour supply on page 228. In passing it should be emphasized that this attitude reflects no discredit on the official concerned, who, within the limits of policy ruling, could not have been more helpful. It does, however, reflect on the need for some serious re-thinking of the Chamber's public relations policy.

It may be no more than a coincidence that the attitude towards public relations shown by the Mine Managers' Association, whose offices are housed in the Chamber of Mines building, should have proved to be somewhat unenlightened. In any event, it was indeed a shock to us to discover that the Association places a complete embargo on the reproduction in the press, either in part or in whole, of any technical papers read before it, despite the fact that clearance is invariably obtained by the author from the mining house concerned before the paper is presented. So far as we know this case is unique among professional associations, and indeed it is difficult to see how the advancement of mining and metallurgical know-how could be promoted by the Press at all if this kind of attitude were prevalent. Presumably the outcome of this policy, if persisted in, will be for mining engineers and others who have done original work to seek to present their findings from the platform of some other professional body less inhibited in its relations with the Press.

Western United States

(From Our Own Correspondent)

Portland, Oregon, February 6.

Uranium news still carries accounts of consolidations and sales of properties that would tax the credulity were it not that proof is forthcoming that such transactions actually have been made, sales that make what would have been considered a large deal a few brief years ago seem like small change. The latest, and largest to date, is the purchase of Happy Jack mine by National Mining and Milling Co., a newly organized company with powerful financial background. The price is reported at $30,000,000, of which $10,000,000 is paid down with the balance to be paid over a period of ten years. The mine is considered to have 1,500,000 tons of a gross value of $52,000,000 blocked out and is one of the largest and richest on the Colorado Plateau. A "minor" deal is the purchase for $8,000,000 cash by the Hidden Splendor of control of Almar Minerals, Inc. Almar is a small mine with only 600,000 tons of reserves. A lesser deal on some of the other Almar properties involves a mere $3,350,000.

Continental Uranium has signed a contract with AEC for construction of a mill at La Sal, Utah. The mill will treat custom ores as well as those from Continental's properties and the contract provides that the company may recover and retain ownership of any vanadium in the ore. This will bring to 14 the number of uranium mills operating in the West. Vitro Uranium Co. has made a contract with Hidden Splendor to mill a minimum of 5,000 tons of the latter's ores monthly.

Western Gold and Uranium, Inc., which has been operating in the Silver Reef district of Utah, finds silver associated with the uranium in sufficient quantity to make its recovery profitable and is building a 50 ton flotation mill to extract the silver before the ore is shipped to the purchasing depot. Atlas Uranium Corporation announces that in developing its uranium claims in San Juan County, Utah, it has found copper ore which has been blocked out to a value of $2,500,000.

Large scale mining in the Plateau area seems to be on the way. Following the announcement that Continental Uranium will strip 2,500,000 cu. yd. in preparing its Rattlesnake Pit comes the news that Homestake will sink a 2,500 ft. incline shaft on its North Alice group in the Big Indian district. Heretofore 500 to 600 ft. has been considered deep mining in this area.

GENERAL NEWS

Salt Lake Tungsten Co. has started operation of its high purity ammonia tungstate plant at Salt Lake City near its main refinery. The new process involved simplifies methods heretofore in use and produces a high grade product that is readily converted to powdered tungstate suitable for metallurgical use.

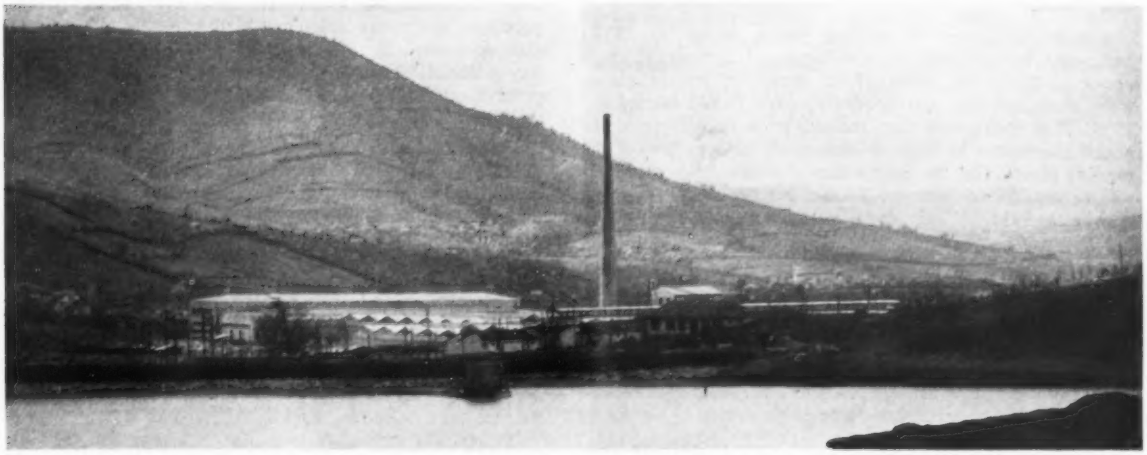
AEC is asking for proposals for supplying up to 100,000 lb. of reactor grade beryllium per year for the next five years. The Government has been getting this metal from its plant at Luckey, Ohio, but the latter did not function last year and will be placed on a standby basis.

Montana has now come into the picture as an iron ore producer. Young Montana Co., an affiliate of Mesabi Range companies, has commenced open pit operation of a deposit in the Great Falls region which averages 60 per cent iron and is of Bessemer lump grade. The deposit has been known for some time but has been handicapped by adverse freight rates which have been adjusted.

Progress of the Non-ferrous Metals Industry in Yugoslavia

By BRANKO DJUKIC

The exploitation of mineral resources plays a key part in Yugoslavia's programme of industrial development. In this article the editor of *Rudar*, Belgrade, reviews the progress of the development of a non-ferrous metal industry based on indigenous resources.



The Arandjelovata electroporcelain factory in Serbia, an example of the modern Yugoslav plant.

Because of its abundance of non-ferrous raw materials, Yugoslavia is unquestionably the richest of the Balkan States. Its mineral occurrences have not yet been adequately explored, but a few years ago it was estimated that proved reserves of magnesite alone amounted to 7,000,000 tonnes and those of rock salt to about 20,000,000 tonnes. There are also important occurrences of asbestos, graphite, barytes, and many other minerals. Only a very limited amount of exploration was carried out before the second world war, while the exploitation of non-ferrous resources was confined to the utilization of a small number of raw materials in a primitive and incompetent manner. It was not till after the war that the non-ferrous materials industry began to be developed on a more extensive scale.

The expansion of Yugoslavia's steel and chemical industries has created additional needs for non-ferrous metals, to which due regard has been given when planning the more intensive development of the country's mineral resources.

Since 1939, the output of non-ferrous raw materials has increased by some 2½ times. This has been achieved by the more efficient use of available capacities, by reconstruction and enlargement of existing works, and by establishing new mines and factories. Parallel with the expansion of production, consideration has been given to problems of treatment and quality.

Particular attention has been devoted to the replacement of imported raw materials and non-ferrous manufactures, if not entirely at least partially, by home-produced metals and metal products, and to the expansion of exports. In 1954, Yugoslavia had a favourable balance of trade for the first time in its history, in spite of the rapidly growing home consumption of non-ferrous metals.

At the same time, efforts have been made to introduce the most up-to-date methods of exploitation, but hitherto the full benefits of this policy have not been experienced because the newer plants and extensions have not been operating to full capacity, due largely to shortage of qualified technicians and skilled manpower. Yugoslavia has had to build up its own labour force as its mining and metal industries grew up, and up to now its technical experts have not had sufficient experience to master the new problems presented by sudden increases in the scale of production.

The following examples, drawn from various sections of the metal industries, give an impressive indication of the rapid tempo at which expansion is proceeding :

The production of cement, which in 1939 amounted to 894,000 tonnes, was raised last year to about 1,600,000 tons —an increase of almost 200 per cent. On the completion of several new cement factories now in the final stage of construction, it should exceed 2,000,000 tonnes. All the larger factories have been designed to produce Portland cement, which is a much better material than comparable grades of the " natural " cement formerly produced by the majority of Yugoslav factories.

Fireclay was the only fireproof material produced in Yugoslavia before the war and in those days the annual output was about 20,000 tonnes. Production has since been expanded by more than 300 per cent, a total of 53,817 tonnes being manufactured in 1954, entirely from materials of domestic origin.

Before the war the only use made of the country's abundant magnesite resources was for the production of a very limited quantity of calcined magnesite, which was made in primitive furnaces heated mainly by wood. Today, sintered magnesite, magnesite and chrome-magnesite bricks are being manufactured in Serbia, where a plant of 72,000 tonnes annual capacity has been erected, and are distributed under the trade name of " Magnochrom ". Instead of importing magnesite bricks, Yugoslavia is now exporting them to other countries. Plants have also been

laid down in Macedonia for the production of fireproof and thermo-insulating materials based on the use of diatomaceous earth.

Due to the reconstruction, modernization and enlargement of existing factories and the construction of new ones, the production of ceramics, which before the war was entirely unmechanized, has been transformed into an important industry. From a few hundred tons pre-war, the annual output will soon have been expanded to include 6,000 tonnes of porcelain china, 6,000 tons of ceramics for home and sanitary use, and 22,500 tonnes of ceramic slates and panels.

The manufacture of window panes, which in 1939 amounted to 1,678,000 m^2, was increased during 1955 by about 4,600,000 m^2, while 27,000 tonnes of hollow glass were produced last year compared with 10,924 tonnes in 1939. It is anticipated that, following the construction of a new glassworks in Skoplje, Macedonia, and extension of existing glassworks, the production of hollow glass in 1958 will be equivalent to about 2.3 kg. per head against only 0.70 kg. in 1939.

The production of rock salt, which before the war was 75,000 tonnes annually, is now in the region of 130,000 tonnes. When the salt mine at Tusanj, Bosnia, is in full operation, it will rise to 400,000 tons. After satisfying local requirements, this will permit further extension of the factories which use salt as a raw material.

Barytes production has been expanded from about 300 tonnes annually pre-war to 100,000 tonnes in 1954, almost the entire output being exported. The production of asbestos fibre, which was not started until shortly after the second world war, has risen from 309 tonnes in 1947 to about 3,700 tonnes in 1955. In order to meet the country's requirements for fibre, a considerable number of mills have been established.

EXPLOITED MINERALS

Minerals now being exploited on an increasing scale also include various kaolins for the paper industry, felspar products, and many other materials of value to the Yugoslav economy, the air being to eliminate importation of any materials or manufactured products which can be supplied by industries based on the country's own indigenous resources.

Yugoslavia has an ambitious programme for the future development of its non-ferrous metal industry. It is anticipated that two or three years hence the output of non-ferrous materials will be double the 1954 production and four times greater than that of 1939, while the production of fireproof materials—fireclay bricks, magnesite bricks, sintered magnesite, etc.—will be eight times greater than in 1939.

The country's wealth of non-ferrous raw materials is regarded as providing great possibilities for further exploitation.

LABOUR FOR SOUTH AFRICA'S GOLD MINES—I.

Demand Greater than Supply

The facts on which the following article is based were collected by our Joint Editor, Mr. U. Baliol Scott, during a recent visit to South Africa. It should, however, be emphasized that when approached officially regarding the outlook for native and European labour supply, the Chamber of Mines felt itself unable to give *The Mining Journal* any material assistance. Consequently, although we believe the facts, and conclusions drawn therefrom, to be substantially correct, we have in the main no official confirmation for them. In so far as they may happen to be incorrect in any particular, the Chamber has the remedy in its own hands, and we shall at any time be glad to publish such comment or such further information as the Chamber may on reflection care to make available. This first portion of the article surveys the present and prospective labour supply position. The concluding portion will consider certain technical and other considerations which may alleviate an otherwise uncertain prospect.

Over the past two years, the average number of natives employed by the gold producers in the Transvaal and O.F.S. Chamber of Mines has averaged around 310,000, some 70 per cent being underground workers. Roughly one-third of this total comes from the Union itself, and another third from Portuguese East Africa while the High Commission Territories and the tropical areas each account for about one-sixth.

Although there appears to be fairly solid ground for believing that this level of supply (which as will be seen later is perhaps 15-20 per cent below present theoretical requirements) can be maintained, there is some division of opinion as to the extent to which the Chamber of Mines' extremely efficient recruiting organizations can be expected still further to increase the supply to meet the expanding requirements of the new mines—at least until such time as these growing establishments can be offset by the release of labour from mines closed down by exhaustion or mounting costs.

THE SOURCES OF SUPPLY

First, as regards native labour within the Union itself. Because of the Union native's relative freedom of movement, the mines have to compete directly with alternative employment in secondary industry, the public services and agriculture. Moreover, outside of the mines, African rates of pay are steadily rising—at any rate in urban areas—so that, with a fixed price for gold, the industry's competitive position is inevitably deteriorating. Whether or not this trend can be arrested would appear to depend in some measure upon the extent to which the prospective tapering off in the rate of industrial expansion will result in any actual reduction of new constructional work.

An obvious example of this is to be seen in the tremendous constructional boom which is still in progress on the West Wits Line, around Klerksdorp and at Welkom and Virginia. Sooner or later the townships in these areas will be complete, but whether the indigenous native will then turn to mining, unless no alternative offers, is doubtful. However, quite a lot of the labour employed by building contractors has come from outside the Union on a contract basis similar to that on which natives are recruited for mines and there is perhaps more reason for thinking that these natives might turn to mining if employment in the building industry were no longer available.

As regards the supply of native labour from outside the Union, the problem is limited less by the willingness of the native to sign on than by the limitations of the quotas imposed by the various governments concerned. Thus the authorities in Portuguese East Africa, the major source of supply outside the Union, are extremely reluctant to increase the present quota. Again, in the tropical areas, where the Chamber's recruiting organization has done a noteably good job and which appear to

offer the most promising sources of increase, quota limitations imposed by some of the governments concerned make any large increase seem at present unlikely. A case in point is Nyasaland where it is thought that another 10,000 natives per annum (double the present quota) might fairly easily be recruited without directly interfering with present local labour requirements. The view in Johannesburg seems to be that reluctance to raise the quota springs mainly from a fear among Nyasaland farmers that greatly increased migration, even for the limited period of a mine contract, would tend to raise the local level of agricultural wages in Nyasaland itself, if too many natives were allowed to become "corrupted" by knowledge of the Union's higher wage structure.

If then the prospects for increasing the supply of native labour are somewhat uncertain, it becomes of real importance to consider, first, precisely what future requirements are likely to be and, second, whether other factors are at work which are likely to mitigate the impact of these needs.

The basis, upon which the native labour quota for each mine is determined, is a matter on which we have unfortunately been vouchsafed no information. It would appear, however, that the method of assessment is complex and perhaps in the short term not entirely equitable in operation as between one mine and another. While a major factor in determining the quota is the mine's scheduled mill capacity, this is by no means the only consideration involved and a variety of efficiency factors and other variables also come into the equation. In practice the system undoubtedly results in the labour position being tighter at some mines than at others, and indeed there have recently been cases where one or two of the older mines have reported actual labour surpluses. However, in the long term these discrepancies get adjusted and there seems no reason to think that the quota system is giving any widespread dissatisfaction.

THE PRESENT SHORTFALL

Taking the industry as a whole the present ideal complement of underground native labour is about 240,000 while the monthly average actually employed is about 215,000. As however this total fluctuates by as much as 10,000 either up or down according to the season of the year the effective total available is somewhat lower, the reason being that fluctuations (more particularly the steep increase in the early weeks of each year) are so sharp that there is considerable loss of efficiency in utilizing labour during these periods. Allowing for other losses due to the non-productive time spent in initial training and due to sickness and other minor causes, it is probably safe to say that the effective underground complements are at present averaging no better than 80-85 per cent of the ideal.

Having said this it is only fair to add that many mines —especially the newer ones—would be extremely embarrassed to-day if they were suddenly to receive their full theoretical native complements. This is because most of the newer mines are seriously understaffed so far as European miners and artisans are concerned, and because under the existing mining laws there is a very definite limit to the number of natives who can be employed effectively underground for one European miner. In practice this ratio is of the order of 10 to 1. The full extent of the native shortage will therefore in any case not become apparent until the industry begins to benefit from the increased recruitment of Europeans, which is being energetically pursued both in South Africa and in Europe alike by the Chamber of Mines and by the Anglo American Corporation (which in addition to sharing in the Chamber scheme has its own recruiting organization in London). Assuming however for the moment that the European shortage—which is the immediate bottle-neck—has been resolved (and already the Chamber reports a good response to its campaign within the Union), what is likely to be the extent of future native requirements?

For reasons which will be explained in the second part of this article, it would be a mistake to place too much reliance on the early demise of the marginal mine. On the most optimistic basis (if indeed optimistic is the right word), and making allowance for the mines which must in any case close because they are now nearly worked out, it is difficult to envisage at the most more than about 750,000 tons of mill throughput per month being lost by 1960 from old or marginal mines. Taking the present average underground native efficiency for the declining mines at 30 tons per native per month (against the average for the industry of 35 tons), this represents the release of about 25,000 underground workers by 1960 or perhaps rather under 35,000 natives in all.

WHAT ARE FUTURE REQUIREMENTS?

Against this, there are three mines on the West Wits line, six in the Klerksdorp area, and ten in the O.F.S. (all either already milling or else due to start this year), which between them are now milling a total of 1,080,000 tons per month and may be expected eventually to mill a maximum of 2,375,000 tons per month, assuming mill capacities of 125,000 tons. Even if we allow a short-fall of 10 per cent from this theoretical maximum, due to future programme revision at some of the mines, it still means that labour has to be found by 1960 to mill about another million tons per month. If we allow that underground efficiencies will in the meanwhile have risen to 40 tons per native per month (i.e. that the present rate of improvement in efficiency is maintained) this means that another 25,000 underground native workers must be found, or say 35,000 including surface workers, i.e., the same number as we might hope to see released from the declining mines. (It should be noted that present labour efficiencies in the O.F.S. are averaging no better than about 25 tons per native per month, but this figure will, of course, improve as output is increased.)

However, this estimate takes no account of requirements for a number of new mines which are in prospect; notably Winkelhaak and possibly one other in the Bethal area, perhaps a mine in the Zandpan area of Klerksdorp, the Riebeck mine which is expected to work the Van den Heeversrust area, the Saaiplaas mine and of course the probable though longer term requirements of Western Ultra Deep Levels to the south of the West Wits Line. These mines, between them, may well require at least 2,000 natives underground by 1960 and will, of course, eventually, require about ten times this number. If we allow a rough ratio of two to three between underground and full mine complements, it is probably a conservative estimate to say that 40,000 natives will have to be found for the developing mines by 1960 and a further 20,000 perhaps by 1965. Thus on the most favourable estimate of the rate at which labour will be released from the older mines, native complements will have to rise by some 5,000 or more by 1960. This in itself should present no great difficulty, but the situation in the intervening years may well be tighter than these figures suggest. Not only will the build up at the new mines be progressing steadily (say at an average rate of 8,000-10,000 a year), but against this *certainty* we have only the *prospect* of a substantial falling off in requirements of the old mines which, historically, have had a disconcerting habit of exceeding their expectations of life.

There are, however, a number of other factors in the situation which throw a more encouraging light on the picture. These will be considered in a second article.

Gas Producers for Metallurgical Processes

By C. C. DOWNIE

The use of the gas producer in its different capacities for various metallurgical processes has already been described in detail under the categories of the specific metals concerned. It is evident that no one type of producer will satisfy all conditions and, further, the method of operating them has also to be varied to suit specific needs. The following article describes the producers for various metals, accentuating various recent improvements in designs.

The use of the gas producer in its different capacities for various metallurgical processes has already been described in detail under the categories of the specific metals concerned. In the zinc industry, producers are required not only to fire the retort batteries, but the gases are also used for calcining calamine and roasting blende, etc., in muffles and roasters. To a smaller extent they are likewise used for recovering cadmium from the flue-dusts, but only when a sufficiency exists to justify this system. In smaller zinc works, the cadmium-bearing materials are handled in individual retorts fired by oil-fuel. The same remarks apply to handling zinc residues relatively rich in silver, and zincings from the Parkes process. Gas producers are well established in the recovery of nickel by the carbonyl process, and despite the intrusion of alternative systems, remain widely utilized. They are still also used for roasting nickel, and nickel-copper mattes in some areas, and hence the producer here represents a primary unit of the plant.

In wet copper extraction, the gas producer, while still used in many quarters to operate the multi-deck roasters, has recently to some extent been competed with by pulverized coal roasters. In the extraction of chromium for the production of various dichromates, etc., the gas producer was for long years a primary feature, because ammonia was obtained as a by-product, and thus permitted its full utilization. (The ammonium sulphate by direct reaction with the calcium chromate solution provided ammonium chromate.) Due to changing conditions, however, as ammonium sulphate could be acquired more cheaply from outside sources, the process was changed, and to-day calcination of the chrome ores with dolomite, etc., is performed in rotary pulverized coal-fired furnaces.

LIMITED USE FOR LEAD

In lead smelting, with the exception of the Italian system of firing rotating hearths with gas, for roasting poor lead ores, where fuel is scarce, the producer is only used to a limited extent. It has, however, been engaged for supplying controlled heat for lead pans where certain tin, lead, antimony crystallizing systems are carried out. Producers are also engaged for roasting selenium and tellurium slimes, for roasters engaged on chloridizing of some of the more complex ores, and for a number of other odd purposes. Of recent date, great developments have been made with submerged combustion, where gas-firing is directly used to heat tanks and vats, where the products of combustion can do no harm.

This permits heating of liquors to be economically performed on the shortest notice without the need for outside heating appliances, but it cannot be stated if these units are normally linked-up with producers, and so far have been mainly used with town-gas supplies.[1]

From these multifarious roasting operations, sulphur oxides are evolved, which by oxidizing and suitably condensing, are converted to either crude sulphuric acid, or with chlorodizing roasting, to a mixture of sulphuric and hydrochloric acids. As a rule, the metallurgical works in general do not attempt to refine these to pure acids, but the crude acid suffices for wet extraction purposes. (Gas producers of special construction without steam, are used in the concentration of sulphuric acid, and were earlier used for firing platinum stills, etc.)

TYPES OF PRODUCERS

It is evident that no one type of producer will satisfy all conditions, and further, the method of operating them has also to be varied to suit specific needs. For example, the sytem mentioned of recovering as much ammonia as possible to accommodate production of ammonium chromate, etc., relates to one method of handling the Mond producer. Less steam is used, and the plant layout modified, where by-product tar and ammonia recovery are not necessary, while the gas has its 12 per cent carbon monoxide raised to some 28 per cent.

Accurate control of the carbon monoxide content is essential in the nickel carbonyl process, and after suitably carbonizing it, the content of carbon monoxide is raised to about 80 per cent. In wet copper extraction, conditions of working are not so restricted, and the gases have more to attain a certain fixed calorific value, than to reach any specific chemical composition.

The same remarks relate to operating producers for zinc and cadmium treatment, and most of the roasting systems, where the main feature is simply to acquire the best heating conditions. Since gas producers are required for gas-works, steel-works, and various other industrial uses, competition on the means of acquiring the best gas for specific uses has been the subject of an enormous number of patented designs and processes.

In earlier years, the gas generator designs selected for operating roasting hearths, such as the Siemens, Bicheroux, and Boetius types, were elaborate, and occupied much space, while unable to provide the high calorific value or efficiency of the modern water-gas producer. This was followed at the First World War period by numerous other constructions such as the Duff, and Swindell water-seal steam-blast producers, the Smythe continuous self-cleaning producer, the Hughes mechanical unit, and the Taylor arrangement equipped with revolving bottom, whereby clinker is broken up and discharged automatically. The Kitson arrangement which formerly had no provision for ash removal, introduced an alternative mechanical ash removing equipment, while the Fraser-Talbot producer had the bottom shell of truncated conical shape, with stirring arms.

In studying more modern roasting layouts, it has to be observed that American practice differs somewhat materially from European practice generally in that much more oil-firing has supplanted not a few of the systems which formerly engaged the producer. Still further, some concerns have used a combination of water-gas and oil-gas. The automatic gas producer introduced by Wellman, however, was considered to be an appreciable advance on existing designs, whereby although hailing from America, it had the manufacturing rights for most other countries acquired by German firms. In this revolving-grate arrangement, with stirring arms, water-cooled poker, and controlled feeding device, etc., the output, under otherwise

similar conditions, is claimed to be 2.1 times that of ordinary stationary grate gas producers with hand feeding.

Briefly, using small coal, nuts, etc., of which some 60 to 70 per cent were passed through 13 mesh sieve, efficiency of gasification amounted to from 78 to 81 per cent. Nuts and breeze realized 75 per cent, while mixtures of 25 per cent coke and 75 per cent coal realized 79 per cent efficiency. Detailed particulars of the composition of coal, coke, gas, ash, and blast used have appeared elsewhere.

While large units of the kind can handle from 2 to 2½ tons of fuel per hour depending on its composition, smaller producers are also available.[2] Another construction also incorporating automatic feeder, revolving grate, and stirring arrangement, etc., is claimed to give uniform quality and quantity of gas, as a result of the systematic charging and distribution of the fuel. This uses a patented distributing, rotating disc, and a number of distinctive mechanical advantages, but as a rule, appears to be for more modified capacities.[3]

Certain smelteries required to have the producers specially modified in construction to meet the requirements of the bituminous coal on hand, to ensure acquiring the necessary conditions for dealing with copper ores. Depending on the quality of the gas, provisions had to be made to meet the varying heating-up period by diverting and mixing different gas compositions, and altering the runs to slightly cool the fire, etc.[4]

SOME IMPROVED DESIGNS

While different designs of producers are too elaborate to enter into in detail, ordinary Mond gas differs from others in that it is poor in carbon monoxide, and rich in hydrogen and carbon monoxide, producer blow-up gas can attain 32 per cent carbon monoxide and 64 per cent nitrogen, whereas water-gas can reach 44 per cent carbon monoxide, 48 per cent hydrogen, and under three per cent nitrogen.

Improved forms of producers can gasify the poorest coke for the production of heating gas, with provisions for removing dust, and cleaning and cooling the gas in suitable washers, while dry separators are also included to relieve the work of wet cleaning. The gasification efficiency is claimed to reach 77.5 per cent, and guaranteed at 75 per cent, using all descriptions of coke qualities.

This plant is equipped with automatic precision regulators for regulating the output and the gas pressure, besides a variety of measuring instruments, such as output indicators, pressure gauges, thermometers, and recorders. Provisions are made for automatically feeding the fuel, and discharging the waste material, besides removing the latter to a waste dump, and also provisions for mixing lean gas with rich gas. The same concern constructs dry producers, where gasification is carried out with cold blast without any injection of water or introduction of aqueous vapour. The resulting gas is claimed to contain no hydrogen, and besides inert gases, 32 per cent carbon monoxide.[5]

Elaborate designs of producer plants for heat and power gas, besides vacuum evaporating, crystallizing, drying, and calcining equipment, are set-up complete by another undertaking. An entirely new process for handling lignite coke in a shaft form of producer is also claimed.[6] Further developments have also been made on what was originally known as the Winkler form of producer. The shape and dimensions have been altered, and makes it possible to gasify fine-grained fuels, such as small breeze, and attain high efficiency without trouble. This, together with partly powdery fuels, such as lignite or lignite coke, are charged, and the blast and steam pressure are so high that the whole fuel bed is kept in suspension, where the lignite yields ordinary producer gas, and by adding steam yields water-gas. Where a great scarcity of the normal types of fuel is conspicuous, and lumpy material not available, this form of design holds special advantages.[7]

In other directions, large types of water-jacketed rotary-grate producers for dealing with waste coke of from ¼ to ½ in. grain size have been developed, and while this attracted the attention of metallurgical firms, it is not known if they have been accepted. One of the features of these latter activities, is that what is normally regarded as hard-to-sell material, is put to useful service.[8] A number of reduction processes for the rarer metals which normally utilized coal-gas, turned their interest to water-gas, but which tended to contain sulphur and cyanogen compounds. It was found that an earlier patented system, specifically intended for purifying water-gas, could remedy the trouble, and which comprised passing the gas through glowing oxides of rarer metals, alkaline earths, and earths.[9]

One of the large chromium extraction firms engaged as many as nine 20 ft. high producers for operating their calcining hearths, but strangely enough, used coal-firing for burning their magnesite materials. On the other hand, the latest magnesite concerns use a form of blast-furnace for burning magnesite, but which is fired by producer gas. Although molybdenum is nowadays largely recovered by improved methods, no small efforts were also made to apply water-gas specially adapted to reduce the oxides. The process of manufacturing cyanide for gold extraction (originally started in Glasgow), also involves the use of select producers.[10]

NOTE ON INSTRUMENTS USED

Lastly, reference is made to some innovations in instruments associated with producer practice. In order to maintain a constant heating value in the gas, where both rich and lean gas are available, a regulating calorimeter, with calorific value recorder, and built-in remote transmitter has been developed. The gas is branched-off, burned in the calorimeter, the temperature change acts upon a thermostat, and actuates a control cylinder, whereby the regulating organ is ultimately operated. Any fluctuations are balanced, while a tracing device keeps a continuous record.[11]

Another instrument continuously records the calorific value directly, where no mixing is necessary, by drawing in the requisite proportion of air, to give recorded results of the combined combustible gases, and is claimed to be an improvement over existing models.[12] Where gas is used in a small way, a safety device has been evolved for the burners connected with furnaces and stoves. A diaphragm subdivides the gas, which enters from the supply into two chambers, connected by a by-pass, and when burning, a slight excess pressure established itself above it. When the main cock has been opened, this pressure opens the main valve, but if for any reason, extinction arises, the valve closes, and pressures on both sides of the diaphragm are equalized, whereby so long as the by-pass flame is not burning, there is no possibility of gas entering the burner. Push-button valves and other features are included in the layout.[13]

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(2) Wellman Engineering Co., Cleveland, Ohio.
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(5) Demag, A.G. Duisburg.
(6) Lurgi, G.m.b.H., Frankfurt/Main.
(7) I. G. Farbenindustrie. A.G., Ludwigshafen.
(8) Kohlenscheidungs. G.m.b.H., Berlin.
(9) German Patent No. 159136.
(10) Dellwik-Fleischer-Watergas Co., Frankfurt/Main.
(11) Askania-Werke. A.G., Berlin.
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MACHINERY AND EQUIPMENT

A Range of Drilling Equipment

On Wednesday, February 15, representatives of the technical press visited the Matlock Lead Mine, where Atlas Copco demonstrated a range of their drilling equipment, on show for the first time in the United Kingdom.

Among the units displayed was the B.B.D. 45 W.R. drill, which combines three operations in the one machine, that is drilling, driving in of the roof bolt and tightening the nut. This machine does not need an impact wrench. Unlike an ordinary stoper the B.B.D. 45 W.R. drill has right hand rotation. To obtain the required torque the drill has down stroke rotation, with the rotation chuck and chuck bushing joined together to give a better resistance to the torque that arises with tightening the bolt. Water flushing is automatic but a separate cock must be fitted to the water hose to turn off the water when driving in and dogging the bolt.

To simplify the three fold action of drilling, impacting and nut running, the roof bolter is supplied with two adaptors, a shank hammer and a shanked hexagon nut socket. The shank of the nut socket is designed to transmit the torque of the bob rotation but not the piston impact.

With the B.B.D. 45 roof bolter one man is capable of fixing a bolt in about half the time normally required.

Type	*Piston bore in.*	*Piston stroke in.*	*Strokes per min.*	*Weight lb.*	*Hose*	
					Air in.	*Water in.*
B.B.D. 45 W.R.	2⅞	1¼	3,000	77	¾	½

The sequence of operations is first, drilling the hole. This is done by using the roof bolter as a stoper and drilling with standard Sandvik Coromant tipped steel of a suitable gauge. The time required for drilling a 6 ft. hole for a ¾ in. bolt is about four minutes in hard rock. Second, for impacting the bolt a shankhammer is fitted to the rockdrill. The roof-bolt expander is split by a series of rapid blows on the projecting end of the bolt. Third, tightening the nut is carried out with a hexagon socket adapter. The torsional pull exerted on the nut is about 250 ft. lbs., or more than adequate for any mine bolting job.

The Atlas Copco 45WR triple purpose machine

Atlas Copco rockdrill type BBD41WK for fast drifting

The B.B.D. 41 W.K. rock drill, which can be used equally well for benching or drifting, has a high rate of impact and is recommended for use where speed is of paramount importance. Tests carried out in French and Italian mines and on Swedish hydro-electric projects indicate that it is well above the speed range of the average lightweight drill.

Despite its high speed performance the B.B.D 41 has a lower air consumption than many slower machines. At Matlock it has proved to be 30 or 40 per cent faster in medium to hard limestone than its predecessor, the Atlas R.H 754. Comparative air consumption figures at 85 p.s.i. are:— B.B.D. 41—113 c.f.m. R.H. 754—127 c.f.m.

Under normal conditions a drilling speed of 25 in. p.m. may be expected in hard granite using an airleg. When hand-held for benching, drilling speed is about 16 in. per minute. Depending upon the rock, piston speed is 25 to 50 per cent greater than drills of similar size.

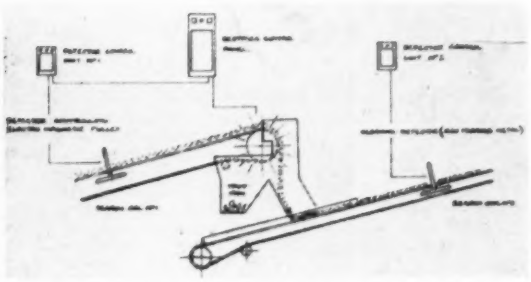
Other drills demonstrated included the B.B.D. 11 W.H. unit, a modified version of the light jackhammer B.B.D. 11 L.T. for short holes, boulder blasting, roof bolting, etc.; the B.B.D. 11 L.T. plug and rock drill, and flexible tungsten-carbide drill steels with flat bar steel rods.

A new type of drill steel type S.R. is now available as a result of research and development work carried out by the Sandvik Steel Works and Atlas Copco. This steel has much greater strength than before, which is achieved by subjecting the steel to anti-corrosive treatment which greatly increases the fatigue strength of the material. The outside, as well as the flushing hole of the drill steel, is protected against corrosive attacks by means of this new treatment. S.R. drill steels are also provided with airtight plastic caps on the bit and collar ends as a further protection during transport and storage.

Protection Against Tramp Metal

In the mining and quarrying industries, protection of crusher and other equipment by magnets is a well-established practice. It is the only form of insurance against damage and stoppage of work caused by the presence of tramp iron. During recent years the Metal Detector has been introduced, which operates as its name implies. The addition of this device to the protective magnetic techniques is important inasmuch as it will signal the presence of those metals not prone to magnetism. It cannot discriminate or extract them, but a marking device can be incorporated to aid location.

A notable contribution to the solving of the tramp metal problem—now more difficult due to increasing belt speeds and burden depths, is the employment of both magnet and detector. In this combined unit the magnet carries out its normal function by attracting and removing ferrous contamina-



Electronic metal detector used in conjunction with an electro-magnetic pulley

tion, whilst one detector, operating in conjunction with a special rectifier unit controls the excitation of the magnet windings, whereby maximum saturation takes place only when an unusually large piece of iron is encountered.

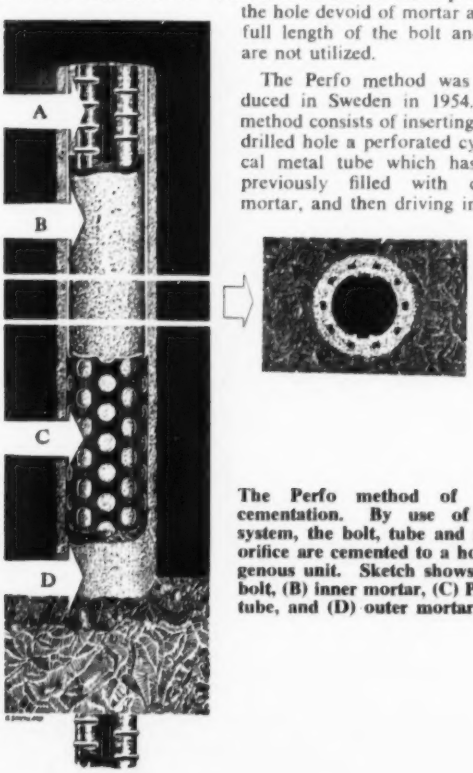
Typical advantages gained by this arrangement are that the temperature rise of the magnet windings are minimized, current consumption is lowered, and greater magnet efficiency gained when tramp iron is actually within the range of the magnet. A secondary detector, forward of the magnet, functions as a gleaner and stops the belt to permit removal of manganese digger teeth and other damaging non-ferrous bodies. Metal Detection, Ltd., are collaborating with Rapid Magnetic Machines Ltd. on this combination.

Bolt Fixing in Rock

The Perfo method of bolt fixing in rock is represented by Sika Ltd. as being a simple and practical method of securing bolts in horizontal, inclined and vertical bored holes.

Bolts frequently are cemented into holes by injecting cement mortar by compressed air. The method, however, is not completely satisfactory in overhead boreholes owing to obvious downward cement flow. This motion leaves the top end of the hole devoid of mortar and the full length of the bolt and hole are not utilized.

The Perfo method was introduced in Sweden in 1954. The method consists of inserting into a drilled hole a perforated cylindrical metal tube which has been previously filled with cement mortar, and then driving into the tube a plain or ridged bolt. This forces part of the mortar through the perforations of the tube into immediate contact with the sides of the hole, thus cementing the bolt, tube and rock into one homogeneous whole.



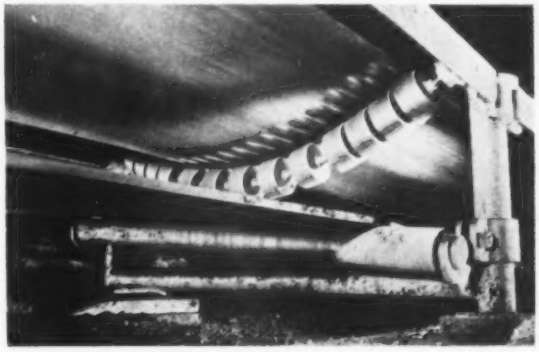
The Perfo method of bolt cementation. By use of the system, the bolt, tube and rock orifice are cemented to a homogenous unit. Sketch shows (A) bolt, (B) inner mortar, (C) Perfo tube, and (D) outer mortar

The Perfo tube is supplied in two halves of varying lengths and diameters according to rock orifice dimensions. In fitting, the tubes are laid side by side, filled with mortar and assembled to form a filled tube. The mortar-filled Perfo tube is then inserted into the borehole. When the Perfo tube is positioned in its borehole, the bolt is inserted into the tube and is driven home.

A Flexible Belt Conveyor Idler

Now being produced in Great Britain for the first time is a flexible belt conveyor idler which shapes itself to the load being carried and uses only two bearings. The idler is being produced by Joy-Sullivan Ltd.

Known as the Limberoller, the idler was first produced by the Joy Manufacturing Company, Joy-Sullivan's parent company in the United States, and they have been operating satisfactorily in a wide range of American industries, particularly under mining and quarrying conditions. For some months the Limberoller has been running on test installations in several British plants. Results have been successful.



Limberoller on stand type LR113. The Neoprene discs are clearly visible

The Limberoller is an idler which has pronounced self-training characteristics, running in only two ball-bearings which have an efficient lubricant sealing system. The bearings are situated above the path of the material. The stands are linked by channel steel stiffening rails between each stand, secured by mating lugs at each span. These rails provide spacing and adequate support but permit slight lateral movement for lining up the belt when erecting the run. No bolts, cover sheets or decking are required when conveyor sections are being made up. With the lowest idler stand the headroom required for a complete conveyor section can be as little as 15 in.

Two styles of stand are available—the standard LR.113 is 13½ in. or 16 in. high, and has a tripod base, and Type LR.102 is arranged for the fitting of a return idler if desired. This type may be added to a moving belt quite simply. The Limberoller and stands are available in three sizes to take belt widths of 24 in., 30 in. and 36 in.

Electrolytic Buffers in Aluminium Polishing

High-purity aluminum may be treated by electropolishing to obtain a light reflectivity of about 85 per cent, according to the *Reynolds Metals Technical Advisor*, United States. Suitable electropolishing treatments involve the use of electrolytic buffers to remove impurities from the aluminum surface and level off minute elevations, and to produce a very thin oxide film on the aluminum surface. This film may be reinforced by subsequent anodizing in sulphuric or other acids to obtain temperature—and corrosion—resistant coating. In the Alzak and Brytal processes the work is made the anode and metal is removed selectively. This process depends on anodic polarization, which occurs only under limited conditions.

MINING MISCELLANY

The Legislative Council of Sierra Leone has approved the new diamond-digging Ordinance, which gives Africans the right to dig for diamonds on their own account

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Dependent on the results of drilling operations now proceeding in Angola, the Portuguese Government has decided to authorize the formation of a company to plan the work which would be necessary if oil was struck.

* * *

The Tata Iron and Steel Company, Ltd., in Jamshedpur (India) has placed an order for the erection of a coking battery for an annual output of 300,000 tons of coal with the Didier-Werke AG, Essen

* * *

Coal production in Yugoslavia during 1955 exceeded the estimated figure of 15,000,000 tons. Hard coal, brown coal and lignite production amounted to 15,060,000 tons or 1,400,000 tons more than in 1954. Despite this increase output fell short of demand. This year production is expected to rise by about 1,000,000 tons as a result of new plants to be completed.

* * *

The Council of O.E.E.C. has decided to set up a Gas Committee, reports Comtel-Reuter. The O.E.E.C. explained that already one third of the area's total resources of available coal were being carbonized and that the trend towards more efficient use of coal was growing.

* * *

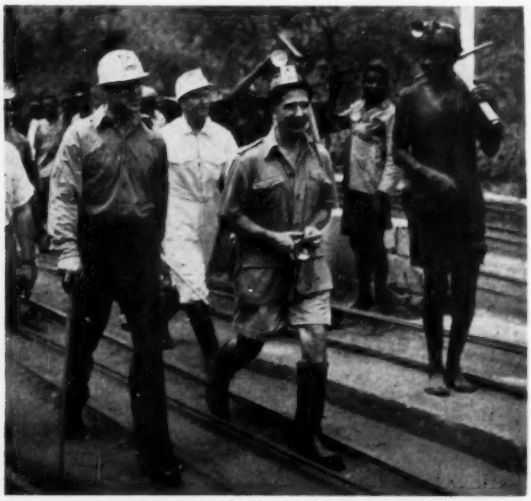
The Anaconda company will submit to the Chilean Government a plan to start preliminary exploration and exploitation work in the "Dead Indian" copper field, situated in the interior of Tarapaca Province. It is stated that this field will replace the Potrerillos mine, where low-yield copper ores will be exhausted within five years.

* * *

Kaiser Aluminium is to undertake a $3,000,000 expansion programme to increase its production capacity of refractory and magnesia products. New facilities will be added to two plants now under construction—the Moss Landing, California, sea-water magnesia unit and the Columbiana, Ohio, basic refractories plant. A new rotary kiln will be installed at the sea-water plant, bringing total kiln capacity to about 375 tons daily.

* * *

The Nigerian Coal Corporation operates three mines in the Enugu coalfield: Iva to the north, Obwetti in the centre, and Hayes (the newest) to the south. During the year ended March 31, 1955, the total output from these three mines mounted to 675,919 tons—a reduction of 3,518 tons compared with the previous year. A nominal profit of £9,307 for the year's operations is considered satisfactory in view of the new wages revision for daily-paid employees, which cost the Corporation approximately £13,325.



During the Royal tour of Nigeria, H.R.H. the Duke of Edinburgh visited the Iva coal mine, in the Eastern area. The Duke was accompanied underground by officials of the Nigerian Coal Corporation

Investigations into the possibility of producing oil from coal in Southern Rhodesia have been shelved for the time being, states Mr. G. A. Davenport, Minister of Mines for Southern Rhodesia. They are likely to be reopened in five or six years, when the Kariba hydroelectric project is "out of the way." By the end of 1952 the Southern Rhodesia Government had paid out nearly £90,000 to consultants who went into the possibilities of a scheme to produce oil from the coal in the Wankie area.

PERSONAL

Sir Ben Lockspeiser, K.C.B., F.R.S., on reaching the age of 65, will be retiring from the post of Secretary to the Committee of the Privy Council for Scietific and Industrial Research. Professor H. W. Melville, F.R.S., has been appointed in his place.

* * *

Dr. W. J. Busschau has been appointed a member of the Gold Producers' Committee of the Transvaal Chamber of Mines.

* * *

Mr. A. Baird Harris has been appointed director of purchases of the Anaconda Company.

* * *

Messrs. Everett G. Fahlman and Arthur V. Davis have been re-elected president and chairman respectively of the Aluminium Association.

* * *

Mr. N. F. H. Railing has been appointed a Director of the Mawchi Mines Limited.

* * *

Mr. Gordon Lamont, of Darien, Conn., has been appointed chairman of the Beryllium Corporation.

* * *

Mr. Jacques M. C. C. Gonse has been appointed to the Board of the Central Mining and Investment Corporation.

* * *

Mr. Brian H. Morgans, London and export manager of Joy-Sullivan Limited, and a director of the American Association Incorporated, is leaving for a tour of the U.S. to visit factories and properties of both organizations. He expects to return at the end of March.

* * *

The Cornish Institute of Engineers will hold the fifth general meeting of members and associates in the Lecture Theatre of the Camborne School of Mines at 7.15 p.m. on Tuesday, February 28, when a paper entitled "Some Aspects of Current Canadian Mining Practice" will be read by Mr. G. J. Shrimpton.

* * *

Some 3,500 members and guests attended the convention of the American Institute of Mining and Metallurgical Engineers held in New York from February 19 to 23. The agenda included a special business meeting at which this 85-year-old organization was expected to finalise steps previously taken to transform itself into the American Institute of Mining, Metallurgical and Petroleum Engineers. It will continue to be known as A.I.M.E.

AGENCIES WANTED

China Engineers Ltd., "Crosby House," 71 Robinson Road, P.O. Box 565, Singapore, are interested in acting as sole agents in Malaya and British Borneo for U.K. manufacturers of gravel pumps (mainly for tin mines), sewerage pumps and steam traps. B.O.T. Ref.: ESB/2993/56.

Production Plant Ltd., 8-14 Clifton Street, Praham, Victoria, Australia, are anxious to extend the range of the agencies they hold for mechanical handling equipment. B.O.T. Ref.: ESB/24937/55.

Baumaschinen AG., Badenerstrasse 582, Zurich, are interested in receiving agency offers from U.K. manufacturers of all types of earth moving equipment, namely bulldozers, diggers, grab-line dredges and shovels, and "traxcavators" (elevators which work on tracks). B.O.T. Ref.: ESB/28419/55.

Mr. H. Schreiber, 108 A.B.C. Chambers, Simmonds Street, Johannesburg, is interested in representing a U.K. manufacturer of cables, wires, bare copper wires, etc. B.O.T. Ref.: ESB/2956/56

This information is supplied by the Special Register Information Service of the Board of Trade, Lacon House, Theobalds Road, London, W.C.1 Telephone enquiries to Chancery 4411, Extension 776.

METALS, MINERALS AND ALLOYS

COPPER.—The extreme difficulty of maintaining a fixed price policy for copper under free market conditions was again exemplified this week in the raising of the American domestic producers' price from 43 to 46 c. per lb. As on previous occasions this move was made necessary by fears that Chile would otherwise divert more future supplies to areas where the free world price was obtainable. The move was initiated by Anaconda who just at the moment are perhaps less able than the other American producers to resist reasonable Chilean requests in view of the negotiations currently in hand for the investment of a further $100,000,000 by the Andes Copper Mining Company in new and expanded copper operations. Nevertheless once the lead had been set by Anaconda, Kennecott and Phelps Dodge followed and the new price became fully effective on Tuesday of this week. The rise had no immediate effect on the custom smelters' 52 c. quotation for prompt metal although forward prices are reported to be firmer at 4½ c. for June delivery. It will be recalled that last week the custom smelters were quoting a backwardation of about 5 c. for June delivery.

This latest advance in the American producers' price naturally gives rise to renewed speculation regarding the likelihood of the R.S.T. price also being hoisted from its present level of £360 i.e. 44 c. per lb. Mr. Prain's views on the necessity of protecting copper against threatened substitution are well known and indeed are held equally strongly by the American producers, who have obviously been forced to this latest increase with the utmost reluctance. Writing in *The Financial Times* some twelve weeks ago Mr. Prain expressed the view that copper would need to come down to somewhere between 30 and 35 c. in order substantially to diminish the danger of substitution. In view of the fact that even at this price copper would be still 5 times more expensive than aluminium on a volumetric basis, this calculation presumably presupposes that for a considerable range of uses where aluminium has already successfully been substituted for copper this market has in all probability been permanently lost. The 30 to 35 c. level should therefore probably be regarded as the safety level for defending copper from further erosion by substitution rather than the price at which many of the markets already lost can be recaptured. Not, of course, that the markets already lost should be accounted any particular disaster. Indeed, it would be more realistic to say that had it not been for the surrender of these markets to substitute materials the price of copper to-day would be astronomical, or else the metal would be severely, and probably inequitably rationed.

Anaconda's prospective $100,000,000 capital programme referred to above (which is in addition to the $126,000,000 recently invested in the new sulphide plant at Chuquicamata) is made up primarily of two programmes. The first covers expenditure of $37,000,000 to increase the mine output at Chuquicamata from 250,000 tons of copper per annum up to 300,000 tons. The second covers an estimated expenditure of $53,000,000 to open up a portion of the newly discovered orebodies near the Indio Muerto mountain, which is approximately 20 miles from the Potrerillo mine. This new orebody has been described by Mr. Roy Glover, Anaconda's chairman, as " the greatest and most important development in copper mining in Chile since the initiation of the Chuquicamata development in 1914. It is expected to take about four years to get the new property ready for production at a planned annual rate of 100,000 tons of refined copper. Only a small part of the property has so far been intensively prospected, 33 drill holes having been put down in the Turquoise Gulch area as a result of which 78,000,000 tons of ore running about 1.6 per cent copper have been blocked out. As present estimates place the life of the Potrerillos reserves at not more than five years, the new Turquoise Gulch mine should be coming into production just as Potrerillos tails off. The present output from Potrerillos is around 45,000 tons of copper per annum, less than half the planned output of the new property. The ore mined at Turquoise Gulch will be railed eighteen miles to a crushing station in the Patos Cerrados Canyon below Potrerillos and the finely crushed ore will subsequently be raised by a three mile conveyor belt to the main reduction works at Potrerillos.

A new wage agreement has now been signed between the miner's unions and the El Teniente and Braden mines which will remain in force until March 31, 1957. This new agreement, made necessary by the expiry of the old agreement on January 1 last, has only been achieved after Government mediation. Salary increases under the new agreement are reported to conform to the provisions of new mining law. Meanwhile rumours are again circulating about the possibility of a further strike at Potrerillos.

The U.S. Senate Permanent Investigating Sub-Committee enquiring into increasing copper shipments to the U.S.S.R. took the opportunity (somewhat churlishly as it sems to us) of Mr. Prain's presence in the States to subpoena him last week in connection with the destination of Rhodesian shipments. Questions of this nature are of course in practice virtually unanswerable as in free world market no primary producer can with certainty know the ultimate destination of his output. However, within the limits of his personal knowledge Mr. Prain was able to reassure the sub-committee and incidentally to disclose that during the period under committee's review Britain had only shipped 33,675 tons of copper to Iron Curtain countries out of total Free World shipments of about 127,000 tons.

This Washington inquisition also had the effect of prompting the comment from the Anglo American group that as the Rhodesian Government controlled by a system of export permits the movement of all copper produced in the Federation it was certain that no copper from Rhodesia was sold to countries under Soviet control.

LEAD AND ZINC.—The U.S. Bureau of Mines reports the domestic mine output of lead last year at 333,400 s.tons, an increase of 2 per cent over 1954. Production was, however, down 15 per cent over the 1949-53 average. Production during the last half of the year was off by about 7 per cent due to strikes mainly in the Coeur d'Alene area. At the same time the Bureau reminds us that " the demand for and average prices of lead and zinc improved during the year and operations were resumed by several important producing lead and zinc mines that had been shut down for periods ranging from less than a year to nearly three years, because of unfavourable economic conditions for lead-zinc mining."

The American Zinc Institute's January figures point to a decline in the volume of new business. Although production and shipments were nearly in balance, there was a decline of 12,000 s.tons in unfilled orders as between the beginning and the end of the month. Stocks showed an increase of about 3,000 tons at 40,979 s.tons.

Commenting on the outlook figure consumption, Mr. Andrew Fletcher, president St. Joseph Lead, said last week that despite the anticipated decline in automobile production this year he expected there would be sufficient growth in other zinc consuming industries, noticeably galvanizing, to offset this loss, leaving them with approximately the same consumer demand as last year. In connection with the coal-fire power plant being put up at Josephtown, Mr. Fletcher observed that sufficient power would be available to make possible at any time an increase in zinc production up to a maximum of 15,000 tons of slab a month. Current capacity, he estimates at 9,000-9,500 tons a month, which he expects to increase towards the end of this year to 12,000 tons of slab plus 2,500 tons of lead-free zinc oxide.

TIN.—No further developments have occurred as we go to press (Wednesday) regarding the labour dispute in the Malayan tin industry. The miners' union, more particularly in the Selangor area, is showing signs of being determined to force what they describe as a showdown with the Mining Employers' Association following the present deadlock in negotiations. Meanwhile, a general strike of Government workers throughout the country appears no less probable than it did a week ago. The strike leaders are meeting Tengku Abdul Rahman this week with an uncompromising demand for a minimum rate of $4 (Malayan) per day against the government's offer of $3.

The Malayan Government found it necessary at the end of last week to issue an unequivocal denial of rumours that the Malayan dollar might be devalued.

Once again news comes from the States of progress in the development of the tinless can. Speaking in New York Mr. William Stolk, president of the American Can Company, stated that his company had decided to eliminate tin from metal cans " as fast as possible " for the reasons that tin was a strategic material, that world supplies were limited, and that there were no sources of supply in North America." Pointing out that satisfactory alternatives for tinplate now existed in many can factories, he added that his company's research workers' had made so much progress that metal cans five years from now would be unrecognizable by to-day's standards. " The tinless can of to-morrow " he said " will be better, more economical and many more products will be packed in them."

There is as yet no further news regarding the U.S. Government's plans for the Texas smelter after next June. Presumably the various bids reputed to have been made by private interests should now soon come up for consideration. If a sale to private interests does not eventuate, Washington will presumably be confronted with considerable pressure from the Texas lobby

to keep the smelter in being. With the I.T.A. now in prospect the eventual decision about the Texas smelter is naturally awaited with interest.

ALUMINIUM.—Temporary production cuts caused by the unprecedented drought in the Saguenay have presented Aluminium Limited with the difficult problem of making due provision for Canada's own requirements of primary metal, while at the same time dealing fairly with the company's export commitments.

Speaking before the Empire Club, Toronto, the president of Aluminium Limited, Mr. Nathaniel V. Davis, pointed out that it was impossible to maintain and build up the flourishing trade which Canada required if export customers were to be asked to take the total impact of all adversities. The present difficulties are, of course, of a purely temporary nature, but it will be a few years before the company can make substantial tonnages available for the U.S., where the continued scarcity of aluminium has seriously affected fabricators in some areas. Mr. Davis told the Empire Club that in the ten year period from 1950 to 1959 his company will have spent more than $790,000,000 (£282,100,000) on expansion—an average of $1,500,000 a week. The total capacity of Aluminium's five smelters is 650,000 tons. This year at least 60,000 tons—perhaps as much as 90,000 tons of annual capacity—will be added at the Kitimat smelter and a further 22,000 tons at the Isle Maligne.

Mr. Davis suggested that, contradictory though it might appear at first glance, the huge fabricating industry in the U.S. could derive nothing but benefit from a further cut in the duty on canadium aluminium. There might be as many as 24,000 firms in the U.S. dealing in aluminium in one form or another and obtaining their supplies from several producers of the metal. Being fabricators themselves the U.S. producers used much of their own output. In contrast, Aluminium Limited is not so heavily committed in the field of fabrication and has compelling reasons to be a seller in all markets of aluminium in primary form. These circumstances have influenced many independent firms in the U.S. to turn to the Canadian company as a source of the metal.

Because of the increasing demand for aluminium Alcoa is accelerating expansion of its Texas facilities. Work on the current Texas smelting capacity expansion was started five weeks ahead of schedule, while enlarged facilities at Point Comfort are already in production. Plant constructed in the first phase of an expansion programme is expected to start operation on March 1. Completion of the Rockdale expansion will boost that plant's capacity by 50,000 tons of primary aluminium annually, while the Point Comfort plant is scheduled for an annual increase of 25,000 tons. The new production will partially offset reduced output at Alcoa's Tennessee smelter and will help to make up for the substantially curtailed imports from Canada. Meanwhile the outlook for U.S. fabricators is becoming less bleak ; it is, in fact, improving steadily, though this will not readily be apparent during the first quarter or even the first half of the current year.

Special new railway tariffs for aluminium have now been approved by the Ministry of Transport. Under the new regulations, the transport of raw aluminium from the Pyrenees will no longer benefit from a special cut in freight rates. However, a special reduced tariff will in future be granted for aluminium exports to offset the loss suffered by producers.

The London Metal Market

(From Our Metal Exchange Correspondent)

The main talking point in the market during the last week has been the continued strengthening of the copper price in spite of Mr. Macmillan's pronouncement with their special implication that some copper will be released from the U.K. stockpile.

Demand in the U.K. is poor and that on the Continent is very spasmodic, so that once more the reasons for the strength must be looked for farther afield, and even when the American scene is surveyed there seems very little reason for the price in London having gone up, as, although the U.S. producers' price has been raised to 46 c. per lb., the custom smelters' price remains at around 52 c. per lb. and it is this price which governs whether copper is shipped westward across the Atlantic or not and the majority opinion is that with the London price over £400 per ton for cash this becomes uneconomical.

An interesting feature of the market has been the tendency for the backwardation to narrow through the buying of forward metal rather than through the offerings of cash, although during the whole week there have been reasonable tonnages of cash offered as would be expected from the increase of about 1,500 tons in the warehouse stocks published on Monday. With the market in its present mood little attention has been paid to the possible effects of U.K. Government copper being released, but should this happen the market must feel the effect and it must also be remembered that practically everyone throughout the copper industry would prefer to see prices at a lower level.

Other markets have all had a firm undertone, but this stems rather from the strength of copper than from any intrinsic happenings in their own spheres.

On Wednesday the Eastern price of tin was equivalent to £785 c.i.f. Europe.

Closing prices and turnovers are given in the following table :

	February 15		February 22	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Copper				
Cash	£400½	£401	£417	£417½
Three months	£384	£384½	£405	£406
Settlement	£401		£417½	
Week's turnover	4,150 tons		5,300 tons	
Tin				
Cash	£802½	£805	£820	£825
Three months	£773	£775	£777½	£782½
Settlement	£805		£825	
Week's turnover	740 tons		400 tons	
Lead				
Current half month	£118½	£118¾	£121	£122
Three months	£114¾	£114½	£117½	£118½
Week's turnover	3,700 tons		4,250 tons	
Zinc				
Current half month	£100	£100½	£102	£103
Three months	£96	£96½	£98	£98½
Week's turnover	3,700 tons		3,775 tons	

OTHER LONDON PRICES — FEBRUARY 22

METALS

Aluminium, 99.5%, £179 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60% basis) 23s. 6d./24s. 6d. nom. per unit, c.i.f.
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 12s. 0d. lb.
Chromium, 6s. 11d. lb.
Cobalt, 21s. lb.
Gold, 249s. 2½d.
Iridium, £29/31 oz.
Manganese Metal (96%-98%) £269 according to quantity
Magnesium, 2s. 4d. lb.
Nickel, 99.5% (home trade) £519 per ton
Osmium, £24/27 oz. nom.
Osmiridium, nom.
Palladium, £8 0s./£8 10s. oz.
Platinum U.K. and Empire Refined £32 10s. oz. Imported £39 0s./£41 0s. oz.
Rhodium, £40/£42.
Ruthenium, £16/£18 oz.
Quicksilver, £87 0s. ex-warehouse
Selenium, 112s. nom. per lb.
Silver, 79½d. f.oz. spot and f'd.
Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth	65% 8s. 6d. c.i.f.
	18%/20% 1s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semi-friable) 48%	£15 2s. 6d. per ton c.i.f.
„ Refractory 45%	£14 2s. 6d. per ton c.i.f.
„ Smalls 42%	£12 2s. 6d. per ton c.i.f.
Magnesite, ground calcined	£27 10s./£28 10s. d/d
Magnesite, Raw	£11 10s./£12 10s. d/d
Molybdenite (85% basis)	8s. 2½d. nom. per lb. c.i.f.
Wolfram and Scheelite (65%)	266s. 0d./271s. 0d. c.i.f.
Tungsten Metal Powder (98% Min. W.)	21s. 2d. nom. per lb. (home)
Ferro-tungsten (80%-85%)	18s. 2d. nom. per lb. (home)
Carbide, 4-cwt. lots	£39 3s. 9d. d/d per ton
Ferro-manganese, home	£59 10s. 0d. per ton
Manganese Ore Indian c.i.f. Europe (46%-48%) basis 110s. freight	92d./95d. per unit c.i.f.
Manganese Ore (43%-45%)	82d./85d. per unit c.i.f.
Manganese Ore (38%-40%)	66d./68d. per unit
Brass Wire	3s. 7d. per lb. basis
Brass Tubes, solid drawn	3s. 0½d. per lb. basis

The printing dispute, now in its sixth week, has led to a change in content and a reduction in size of *The Mining Journal*.

Our regular feature, "Mining Markets" has been omitted, while the L.M.E. prices for copper, lead, tin and zinc are those ruling after the close of the morning ring on Wednesday. *The Mining Journal* is not a party to the dispute.

COMPANY NEWS AND VIEWS

Mr. Macmillan and the Stock Markets

The past few days have witnessed disturbed and uncertain conditions on the London Stock Exchange. Yet Mr. Macmillan's upward adjustment in the Bank Rate from 4½ to 5½ per cent last Thursday was ½ per cent below what many had feared, and initial relief—while prompting a rally in sterling—also touched off a recovery in the Funds. But industrials eased substantially right through the list.

Removal of uncertainties about the Government's intentions, which had been overshadowing markets for some weeks, together with an initial feeling that the new measures would not, in fact, halt inflationary measures, put prices better at first. But when the unexpectedly high Treasury Bill Rate became known in the afternoon and further consideration had been given to the problem these gains were lost. On Monday, however, a continuing strength of sterling was mainly responsible for strong recoveries in the Funds which persisted until midday on Wednesday, at which time difficult conditions in the printing trade forced us to go to press earlier than usual. Reflecting these important events, *The Financial Times Industrial Index* showed some recovery from its level of 174.3 last Wednesday to 175.2 by Tuesday 21.

Generally speaking, Wall Street as a market influence has not been accorded much prominence in London during the past few days. After the initial recovery, following President Eisenhower's clean bill of health, markets became somewhat dull, and by Tuesday the *Dow Jones Industrial Index* had settled down at around 477.

Uncertain Outlook for Gold Coast Mines

Reflecting production losses incurred through the strike of African labour on Gold Coast mines which started on November 20, 1955 (and still continues), profits earned by all companies of the Western Selection and Development Group during the final quarter of 1955 show substantial reductions. In the case of Bremang the effect has not been so serious as for the other three companies. The explanation for this is that one dredge has been kept in production on a limited scale by European personnel only. At the other properties plant and equipment are at a standstill but are being maintained together with certain essential services.

Company	*March qtr. 1955*	*June qtr. 1955*	*Sept. qtr. 1955*	**Dec. qtr. 1955**
Amal. Banket ...	120,979	82,202	103,303	**19,492**
Ariston ...	137,381	143,410	143,860	**46,044**
Bremang ...	4,924	42,161	53,020	**20,778**
G.C.M.R ...	32,391	25,026	14,839	**2,395**

With the strike now entering its fourth month the question must be asked how much longer present conditions can continue before complete closure becomes unavoidable. Already Taquah and Abosso has been forced into liquidation and although there may be no direct comparison between this mine and those in the Western Selection Group the event certainly foreshadows grim possibilities. Moreover, were the mines forced to close some, at least, would find it impossible to re-open with gold at its present price.

At the moment it is understood that the Board of Enquiry set up primarily to consider the strike issue is in the process of drawing up its findings. Hearings which it started on January 20 were completed by February 10 but it is not known how long the final report will be delayed. This, it is understood, depends to some extent upon examination of company records in London. As the situation is now extremely urgent the sooner this stage is completed the better.

Meanwhile, although it is generally accepted that some concession to African labour may be granted, the full claim of 15 per cent backdated over two years to October 13, 1953, is obviously out of the question. Indeed, to push demands to this point would bring about the immediate closure of some low-grade high-cost properties thereby resulting in decreased revenue for the Gold Coast Government. It is thought that the Prime Minister, Dr. Nkrumah, is anxious to avoid such an event and is therefore expected to take a realistic attitude directly the Board of Enquiry's report becomes available. Of the fact that the Government will wish the matter settled as quickly and amicably as posible there is little doubt. So far experience at the mines does not appear to indicate any political bias in the dispute which is apparently based purely upon cost of living grounds.

Despite the stoppage a considerable measure of success has been achieved by both Ashanti and Bibiani mines (the former is said to have 1,200 natives at work) in attracting mine employees back to their properties. This is encouraging as African labour appears to be negotiating from an extraordinarily strong position. In fact, there would appear to be little doubt that more than sufficient jobs exist on the Gold Coast in other spheres of activity to absorb all mine labour in the event of a general close-down. In view of this, and the losses likely to be sustained by shareholders, it is a little difficult to understand why greater efforts are not being made at mine management level generally to recover a proportion of lost labour which, even if the dispute is settled without further delay, will be difficult to re-employ completely.

Zandpan To Raise £200,000

A sum of £200,000 is to be raised forthwith by The Zandpan Company by way of an initial issue of shares for cash at par. Subscriptions will be as to £90,000 by Middle Witwatersrand (Western Areas)—which has sundry sub-participants—and as to £110,000 by The Anglo American Corporation of South Africa.

Zandpan Gold will take session of the right to minerals over an area of approximately 3,847 morgen lying to the west of the Hartebeestfontein and Stilfontein mining lease areas to the north of the Western Reefs and Vaal Reefs mining lease areas in the Klerksdorp district.

The consideration payable by Zandpan for the cession to it of mineral rights amounts to £200,000—to be applied in subscribing for shares at par in the Zandpan Company. A further £200,000 becomes payable in cash in the event of an application for a mining lease and after Zandpan has made a further issue of share capital. In the event of such an application being made it has been agreed between the interested parties that Zandpan shares should only be offered present participants pro rata to their shareholdings.

Messina's Higher Profits

Higher prices for copper received by The Messina (Transvaal) Development Company during the year ended September 30, 1955, together with a slight increase in output was responsible for raising the company's total revenue well above that of the previous year.

Year to Sept.30	*Total Revenue* £(000)	*Taxation* £(000)	*Net Profit* £(000)	*Dividends* £(000)	*To Reserve* £(000)	*Carry Forward* £(000)
1955	3,766.2	578.6	1,534.8	1,254.0	200.0	42.1
1954	3,353.9	524.0	1,382.7	1,202.5	400.0	44.1

Dividends on the issued ordinary capital of £330,000 in stock units of 5s. were increased to 380 per cent. This compared with 370 per cent in respect of the preceding year on a smaller issued capital of £325,000.

Year to Sept.30	*Ore* Handled l.tons*(000)	*Grade copper* %	*Recovery* %	*Copper Produced l.tons*(000)	*Ore Tons* (000)	*Reserves cu.* %
1955	816.1	1.68	93.92	14.2	4,797.0	1.94
1954	806.8	1.73	94.10	13.7	4,520.4	1.99

* Excluding 70,795 tons of jig tailings treated assaying .61 per cent Cu. (1954-55 - 71,736 tons at .56 per cent Cu.)

Although ore reserve figures shown above reflect the position at the properties Campbell, Harper, Messina and Artonvilla sections, they do not include the new mines of Umkondo and Rhodesia Copper Ventures. At the former, ore reserves total 324,220 containing 3.73 per cent copper, while at R.C.V. estimates arrived at by diamond drilling and partial development have indicated a volume of 16,000,000 tons averaging 1.6 per cent copper in the Molly section. The first consignment of concentrates arrived from Umkondo for smelting at Messina on June 10, 1955. But production at R.C.V. is not expected to start until about 1959 by which time a rate of 2,000 tons of ore milled a day is envisaged. As this operation should yield something like 10,000 tons of copper metal annually, it is possible that the company's earning power might be nearly doubled by that time.

Apart from its widespread exploration activities—during the past year 79 offers of properties were received of which 56 were investigated—Messina is soon likely to extend its sphere of interest to the Southern Rhodesian steel industry. With this in mind exploration of a high grade iron ore deposit the Bukwe is being carried out while options have been acquired over limestone deposits in the same area.

Company Shorts

Uruwira Makes £91,735.—A report on operations carried out by Uruwira Minerals during the quarter ended December 31, 1955, discloses estimated gross proceeds of returnable metals at present prices amounting to £293,500, and working profits of £91,735 after expenses excluding depreciation and interest on loan. Ore milled rose to 83,096 tons from 66,404 tons during the preceding three months. Production of concentrates, however, declined slightly to 3,091 tons from 3,278 tons assaying 47.29 per cent lead ; 8.63 per cent copper ; 1,173.9 gm. per ton silver, and 25.44 gm. per ton of gold.

Anglo-French Maintains Dividend.—Anglo-French Exploration has maintained its dividend of 8¼ per cent on an increased issued ordinary capital of £900,000 in 5s. stock units. The previous year's distribution was made on an issued capital of £800,000. Profits for the twelve months rose sharply to £113,138 from £86,937 before taxation of £59,056 (£40,245) and £8,573 (£7,583) applied in reduction of book value of investments. Dividends absorbed £45,281 (£38,500) leaving £5,705 against £5,477 to be carried forward. Mr. F. R. Cottell is chairman. Meeting, London, March 28.

Ribon's Improved Current Results.—In his statement to shareholders of Ribon Valley (Nigeria) Tinfields, Mr. A. Hedley Williams, the chairman, said that results for the first eight months of the current financial year ended November 30, showed a satisfactory improvement over those of the previous corresponding period. He did not think, however, that the increase could be maintained during the remaining four months unless columbite was improved by the re-entry into the market of commercial users. To date all efforts on the Odegi areas had been directed towards the development of columbite. Now that sales in the immediate future for this metal were so uncertain, some curtailment of operations had been made and urgent attention was being given to developing tin bearing deposits.

TRANSVAAL AND O.F.S. GOLD AND URANIUM PRODUCERS

Comparison and Analysis of Salient Results for the years 1955 and 1954.

Heading	*Jan./Dec.*	*Transvaal Cos.*	*O.F.S. Cos.*	*Total*
1. Tons milled.....	1955	58,746,700	7,204,000	65,950,700
	1954	57,920,500	4,434,000	62,354,500
2. Ounces Produced	1955	12,413,165*	2,189 102	14,602,267
	1954	12,105,253†	1,122,594	13,227,847
3. Grade per ton : Dwt. ..	1955	4·053	6·077	4·274
	1954	4·001	4·942‡	4·068
4. Working Profits : Gold £	1955	35,160,201	9,092,789	44,252,990
	1954	35,982,722	2,213,064	38,195,786
5. Working Profits : Uranium £‡	1955	15,642,319	1,915,889	17,558,208
	1954	8,105,744	—	8,105,744
6. Total Profits (4+5) £ ..	1955	50,802,520	11,008,678	61,811,198
	1954	44,088,466	2,213,064	46,301,530
7. Working Costs per ton ..	1955	39/1	51/2	40/5
	1954	37/7	51/11	38/8

* Includes miscellaneous producers : 506,599 oz. (1955).
† Includes miscellaneous producers : 545,519 oz. (1954)
‡ Uranium Working Profits are before provision is made for interest on and repayment of loans (East Champ and Randfontein excepted for 1954 period) and include, in certain cases, profits from pyrite and sulphuric acid.

Obituary

ELDRED ARTHUR KNAPP

We regret to announce the death of Mr. Eldred Arthur Knapp, managing director and owner of Knapp and Bates Ltd., on February 16, at his home in St. Leonards-on-Sea. He was 63.

A graduate of the Camborne School of Mines, Mr. Knapp was an acknowledged expert on mining matters and was the pioneer of the flotation process. Widely travelled in the capacity of mining consultant, he was at heart a practical miner. Mr. Knapp was a keen Rotarian and was a Past Master of the Free Masons.

Mr. Knapp first met his partner, the late Mr. Bates, in Burma, and together they formed the partnership which dates back to 1944. The Limited Company which bears their names was formed in 1941.

SAN FRANCISCO MINES OF MEXICO LIMITED

IMPROVED EARNINGS

EXPANDED SCALE OF OPERATIONS

The 43rd Annual General Meeting of San Francisco Mines of Mexico Limited was held on February 20, 1956, in London: **Mr. C. E. Temperley, O.B.E., M.C.** (the Chairman) presided and said:— We published our Accounts this year a good deal earlier than has been our practice in the past. This was possible because, amongst other things, there were no complicated tax problems to settle before closing the Accounts. In future we hope to continue to publish our Accounts with less delay than heretofore—but I should warn you that it may not always be possible to publish them quite as early as we have on this occasion.

When I spoke to you last, I said we expected that the earnings for the financial year to September 30, 1955, would be decidedly better than those for the previous year. Our expectation was fulfilled. In the Director's Report now before you, last year's results are set out and compared with the results for the previous year and the reasons for the major changes are indicated—so I do not think I need deal with these matters at any great length again. In brief, we sold a somewhat smaller quantity of metals than last year but we received higher prices for them and, in addition, we were able to reduce operating costs. As a result, our earnings before taxes rose from £2,556,000 to £3,433,000. Unfortunately our total tax bill rose at the same time from £2,261,000 to no less than £2,944,000. Thus taxes took 86 per cent of our earnings. The net profit after taxes was £489,000. Your Directors recommend the payment of a dividend of 4s. per stock unit. This dividend with Directors' additional remuneration thereon will absorb £478,000, leaving £12,000 of the profit for the year to be added to the balance carried forward.

Operations at the mine flowed smoothly on throughout the year. As a consequence of our biennial negotiations with the Mexican Labour Unions, we granted our workmen in June, 1955, a wage increase of 10%. In addition, the cost of supplies continued to rise. Nevertheless, as a result of our expanded scale of operations, we succeeded in making an overall reduction in the operating cost per ton milled. The tons milled, by the way, reached a new record of 760,000 tons.

As a result of the improved prices obtainable for our products, we were able during the year to mine some of our lower grade ore blocks at a profit. Although this resulted in a small fall in the total tonnage of concentrates produced, it had the desired effect of conserving our ore reserves.

We continued our policy of bringing our mill completely up-to-date. In the immediately preceding years we remodelled the grinding and classifying sections. Last year good progress was made in remodelling and enlarging the flotation sections. As a result we were able to treat an increased tonnage of ore without any loss of metallurgical efficiency. In fact, our zinc metallurgy has considerably improved; the zinc in our mill tails —that is to say the zinc we are unable to recover in our concentrates and have to throw away—fell from about 2% in previous years to only 1.4% last year and is even lower now.

We continue to press on with the underground development of our mines—and the results last year were distinctly encouraging. For instance, in the previous year 27% of our development was in ore; last year the figure rose to 33% which is good for mines such as ours. The favourable results of our development work enabled us to replace all the ore drawn from ore reserves and, on top of that, to increase the total tonnage of the reserves by 94,000 tons to over 5,000,000 tons—grist for the mill for 6½ years at its present rate of milling.

At the Frisco Mine several entirely new veins were discovered. During the current year development will be largely concentrated on opening up these new discoveries.

We have concluded a new long-term Agreement with Compania Metalurgica Penoles, S.A.—the Mexican subsidiary of our good friends The American Metal Co., Ltd., for the treatment of our lead concentrates from January 1 last when the old Agreement expired.

As I indicated earlier on, our increased profits last year resulted mainly from the higher metal prices then ruling. Since the close of the year metal prices have increased further still and we have been able up to date to sell our production at better prices than we got last year. Provided, therefore, prices do not fall or other untoward events happen, we expect that the results for the present year will be satisfactory—or at least as satisfactory as our tremendous burden of taxation will permit.

Once again I am sure you will wish to join me in thanking our loyal and efficient staff at the mine for the good work they have done.

The report and accounts were adopted.

RAND SELECTION CORPORATION LIMITED

(Incorporated in the Union of South Africa)

PROFIT UP BY £46,000

The following is an extract from the statement by the Chairman, **Mr. A. Wilson,** which has been circulated with the annual report and accounts for the year ended Sept. 30, 1955:—

Revenue for the year at £1,352,817 exceeded the total for the previous year by £44,905.

Expenditure for the year was £175,170, leaving a profit for the year of £1,177,647, an increase of £46,865 over last year's figure. The unappropriated profit at Sept. 30, 1954, was £501,029, and this amount, together with the profit for the year, gives a total of £1,678,676 available for appropriation and distribution.

The dividend is unchanged at 2s. 3d. per share, and £250,000 has been transferred to general reserve, which now stands at £6,500,000.

There is an increase of £744,558 in the book cost of quoted investments, which now stands at £6,052,687. The market value of these investments at the year-end was £14,589,187.

GOLD MINING

Last year I referred to the shortages of labour then facing the gold mining industry. There has been some improvement in the position, but shortage of labour remains a serious problem to the industry.

Transvaal Gold Mines.—There has been a reduction in the tonnage milled by the six producing mines under the control of the Anglo American Corporation in all of which we have an interest. The tonnage milled by these mines showed a decrease of 2.5 per cent. in the quarter ended September 30, 1955, as compared with the same quarter in the previous year. There was a small increase of 1d. per ton in the costs per ton milled.

We are interested in two developing gold mines in the Transvaal. Buffelsfontein Gold Mining Company Limited is making good progress on shaft sinking and initial development on the Vaal reef has commenced. Good development results continued to be shown by Vaal Reefs Exploration and Mining Company, Limited, and crushing and gold production are expected to start during the first half of this year.

Orange Free State Gold Mines.—Progress has been marked by a steady overall improvement in the operating results of the mines which has been matched by continued good values in development and the payment of maiden dividends by Western Holdings, Limited, President Steyn Gold Mining Company, Limited, and President Brand Gold Mining Company Limited. The start of production by Free State Geduld Mines, Limited, and Merriespruit Gold Mining Company, Limited, in January of this year marked the completion of what may be regarded as the original mining programme of the new goldfields.

As all the mines have been planned on a large tonnage basis, it is evident that considerable additional profits will be earned in due course, both from tonnage increases and from the resultant fall in costs. Your corporation's substantial direct and indirect investment in the Orange Free State mines is likely to show progressively satisfactory returns from now on.

DIAMOND INDUSTRY

Our interest in the diamond industry is held through our substantial investment in Anglo American Investment Trust Limited.

The diamond market was extremely active throughout 1955 and sales by the Central Selling Organisation reached a record figure of £74,288,695, of which gem diamonds accounted for £50,253,946 and industrials £24,034,749. Diamond sales during 1954 totalled £62,153,125.

The demand for gem diamonds continued to be substantially greater than their production from all sources. The Consolidated Diamond Mines of South-West Africa, Limited, whose production consists of best quality gems made a major contribution to the producers' efforts to alleviate the world shortage of gem diamonds by increasing its production during 1955 by 25 per cent.

Copies of the annual report and accounts are obtainable from the London office of the corporation, 11 Old Jewry, E.C.2.

BARROW HEPBURN & GALE

SUBSTANTIALLY IMPROVED TRADING RESULTS

DIFFICULTIES CONFRONTING SOLE LEATHER INDUSTRY

The 35th ordinary general meeting of Barrow Hepburn & Gale Limited will be held on March 16 in London.

The following is an extract from the statement by the chairman, **Mr. George W. Odey, C.B.E.:**

Broadly speaking, the trading results for the year under review have followed the pattern of 1954 and therefore, it is with considerable gratification that I am able to report a substantial improvement in the nett trading profit for the year, before taxation, which has risen from £324,940 to £382,405. These results have been obtained after a further year of the most difficult trading conditions in the tanning industry. We have a nett balance for the year, after taxation, of £221,414. After providing for our Participating Preference and Ordinary Dividends unchanged, we have dealt with the balance by making an additional Depreciation on Buildings and Plant of £4,307 and by devoting £110,000 to Capital Reserves, thereby leaving the carry forward increased from £304,868 to £307,900.

TRADING ACTIVITIES

The increased use of substitute materials in the shoe industry, and the development of the rubber-moulded shoe with its repercussions on the boot and shoe repairing trade, has inevitably led to a contraction in the use of sole leather. How far this development will go is clearly dependent upon the extent to which the tanning industry is able to convince the general public of the superior qualities of leather, from the point of view of both health and comfort

As a result of steady improvement in quality and in production costs our upper leather tanneries have shown a substantial improvement on the previous year and we have every reason to anticipate a continuance of this improvement in 1956.

The side leather productions of Kitchin & Co. Ltd., Leeds, have proved particularly popular and the casual leathers in which we have specialised have been in great demand.

Our Merchandise Department has continued to expand and is in a position to provide an unrivalled service to shoe manufacturers in both domestic and imported leathers.

Turning to our productions other than leather, our Mitcham factory has continued to produce all types of transmission belting, in leather, balata and rubber, and conveyor belting in both rubber and plastic. Our "Mitcham" rubber conveyor belting and "Plyastic" fire-proof conveyor belting have a universal reputation and are second-to-none for quality. We have continued our efforts to maintain our export trade in belting where we have for some years past been able to record considerable success.

At our main factory at Grange Mills, Bermondsey, where we produce all types of Government equipment, general leather goods and our well-known "Pakawa" travel goods, we have again had a satisfactory year. As far as our travel goods are concerned, however, we have for some years suffered greatly from the impact of the purchase tax which, in the Autumn Budget, was increased from 50% to 60%. It is impossible to exaggerate the devastating effect that this tax has had upon the leather goods industry.

Our interests in South Africa continue to prosper. The Hodgson Extract Company at Durban and the Hodgson Estates Limited, which controls some 25,000 acres of wattle plantations, have maintained the progress which they have made in recent years.

FUTURE PROSPECTS

When it comes to assessing the future prospects for your Company I can only repeat what I have said for the last two years—that if we could get our tanning interests on a profitable basis we should be able to improve upon our trading results very substantially. We have every faith in the ultimate future of the sole leather industry because leather has such great advantages as the material for the boot and shoe industry, not only for upper leather but also as a soling material.

There is no doubt that leather has suffered further from the effects of the Autumn Budget as it affected the boot and shoe trade. While the removal of the 'D' Scheme assisted the higher quality of shoes, the lower price ranges, which had previously been free, became subject to tax. It is difficult to understand how the purchase tax in this instance can be regarded as a suitable weapon with which to fight the rising cost of living. In point of fact its effect has been the exact opposite and the tax has either raised the price of footwear or exercised a further depressing effect upon the price of leather. It is to be hoped that in the next Budget we may see a reversal of these very retrograde steps in the application of purchase tax, which have undoubtedly affected the tanning industry adversely.

Mine Returns

COAL OUTPUT

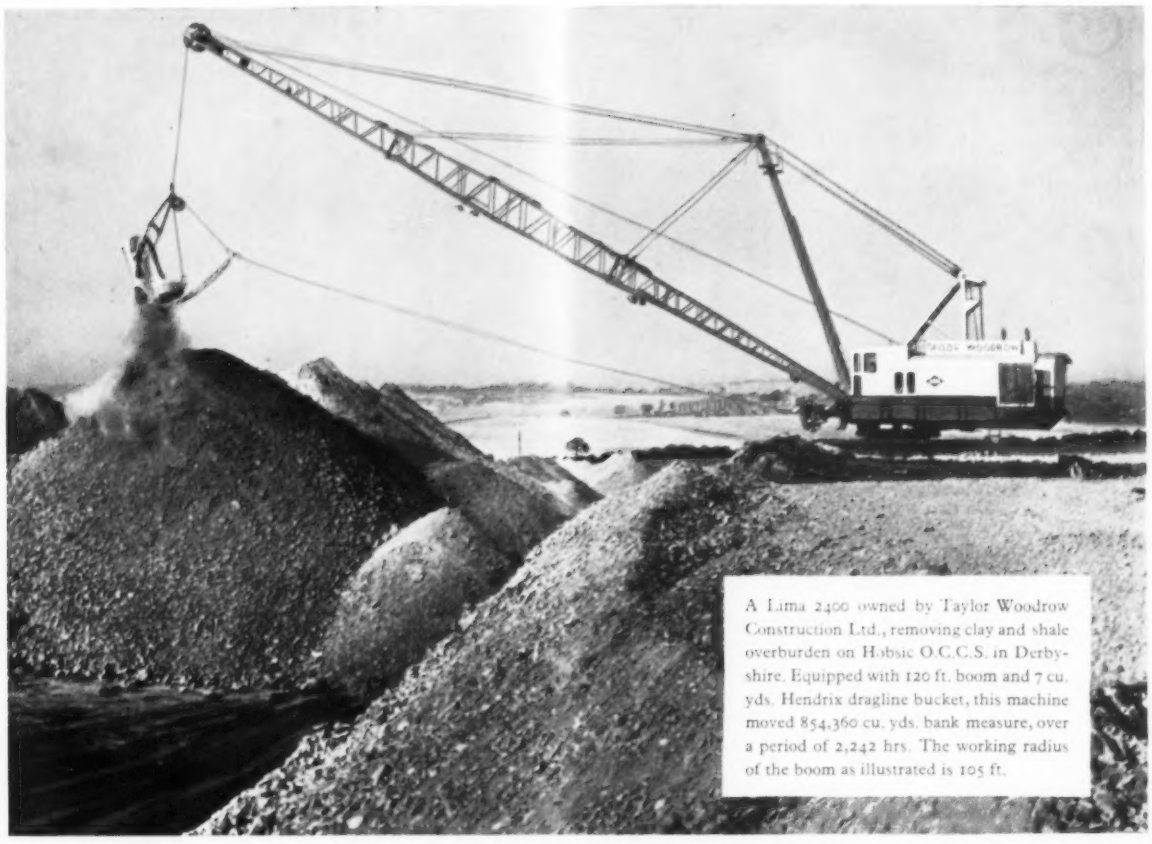
Company	*January (in tons)*	*Months Since Year End*	*Cumulative Totals (in tons)*	
			This year to date	*Last year to date*
Amal. Coll. of S.A.	527,546	1	527,546	542,468
Apex	80,993	1	80,993	87,081
Blesbok	51,067	1	51,067	44,068
Coronation	82,006	1	82,006	93,125
New Clydesdale	83,951	7	554,726	523,688
New Largo	103,607	1	103,607	72,162
S.A. Coal Est.	143,216	7	973,319	950,709
Springbok	71,827	1	71,827	70,894
Transvaal & Delagoa	117,772	5	609,861	619,221
Van Dyks Drift	59,302	1	59,302	60,194
Vierfontein	114,029	1	114,029	99,588
Vryheid Cor.	55,518	1	55,518	45,532
Vryheid Cor.*	42,985	1	42,985	37,900
Wankie Coll.	306,393	5	1,516,149	1,399,652
Wankie Coll.*	19,855	5	91,706	81,551
Witbank	153,723	1	153,723	153,339

* Coke.

OIL OUTPUT

Company	*January (in tons)*	*Months Since Year End*	*Cumulative Totals (in tons)*	
			This year to date	*Last Year to date*
Anglo Ecuadorian	27,616	10	273,245	274,600
Apex Trinidad	36,378	4	143,769	152,607
Kern Oilfields	28,188	8	212,854	210,539
Kuwait Oil	4,306,548	12	53,894,068	46,969,415
Lobitos Oil	45,237	1	45,237	45,728
Qatar Petroleum	000,000	0	0,000,000	0,000,000
Trinidad Central	7,556	1	7,556	8,916
Trinidad Leaseholds	81,164	7	555,828	569,212
Trinidad Petroleum	48,697	6	282,218	246,762
Ultramar Oil*	111,073	1	111,073	117,137

Note: 1 ton taken to equal seven barrels.
* Output figures are for S.A.P. Las Mercedes in which Ultramar holds a 50 per cent interest.



A Lima 2400 owned by Taylor Woodrow Construction Ltd., removing clay and shale overburden on Hobsic O.C.C.S. in Derbyshire. Equipped with 120 ft. boom and 7 cu. yds. Hendrix dragline bucket, this machine moved 854,360 cu. yds. bank measure, over a period of 2,242 hrs. The working radius of the boom as illustrated is 105 ft.

HIGHER OUTPUT and LOWER OPERATING COSTS with the LIMA 2400

TAYLOR WOODROW Construction Ltd. are one of the many leading contractors in the United Kingdom who use the Lima 2400 for bulk excavation jobs, involving millions of cubic yards of earth or rock.

The Lima 2400 is the largest crawler dragline operating in the country. Powered by a diesel engine it possesses the extra mobility required on many sites. There is no need for vulnerable power lines or expensive attendant equipment to prepare working paths. Extra large crawler tracks with low ground bearing pressures enable this excavator to move easily about a site and maintain production when weather conditions would bring other machines to a standstill.

Equipped as draglines or face shovels, Lima 2400's have proved their reliability, by continuous operation under all conditions, over long working periods. The high output and low operating costs obtained on many sites show an unsurpassed performance.

No other excavator of comparable capacity combines so many outstanding design features. Greater stability, lower ground bearing pressure, less strain on tracks in steering, torque converter drive, excellent control, are some of the reasons why the Lima 2400 keeps on the job all the time.

Distributors for Lima Excavators in the United Kingdom and Eire

JACK OLDING & CO. LTD. HATFIELD · HERTS

Scotland: JACK OLDING & CO. (SCOTLAND) LTD., COUPAR ANGUS, PERTHSHIRE. Eire: JACK OLDING & CO. (IRELAND) LTD., COLLINSTOWN CROSS, CLOGHRAN, CO. DUBLIN

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